

# The Electragist

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Vol. 27, No. 5

Association of Electragists  
INTERNATIONAL

MARCH, 1928

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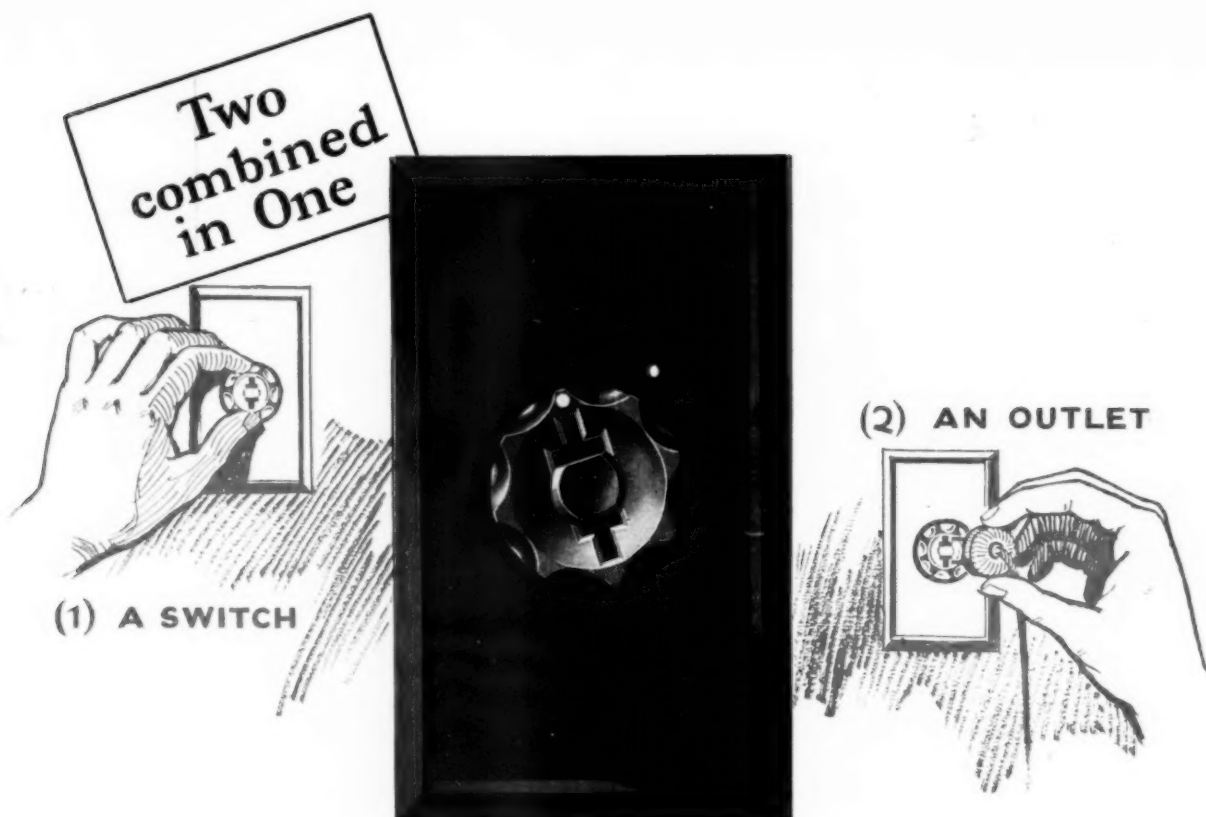
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# *The Electricist*

(The National Electrical Contractor and The Electrical Contractor-Dealer)

Official Journal of the  
Association of Electricists—International

Vol. 27

MARCH, 1928

No. 5

## Saving \$1.71 at a Cost of \$505.89

By F. H. TATHWELL,  
Secretary Manager, The Electrical League of Nashville

WHILE making an inspection on a Red Seal house recently the writer asked the electrician doing the work about the current carrying capacity of the wire he was using and was told very emphatically that the wire was No. 14, that the National Electrical Code allowed 15 amp. on it and, since the circuit he was running only required 10 amp., that he had a margin of a third to the good. But the circuit being a rather long one I wondered what the drop would be. A few calculations showed a drop of voltage of five volts with all lights burning. This circuit was to furnish the lighting for a large living room so it was quite evident that the load factor would be around 100 percent and then it developed that the annual I<sup>2</sup>R losses would more than equal the cost of the wire.

These figures and the reply to my question caused me to inquire how the average electrical contractor determines the size of wire to be used when estimating a job, and I learned that the current density, or the number of amperes as allowed by the National Electrical Code, formed the basis for most all calculations.

Now as a matter of fact the Code was developed to regulate the installation of wire in such a manner as to prevent fires caused by overheated wires rather than to provide an economical manner for distributing electricity. Therefore in arriving at the carrying capacity of the various size wires which make up the table the Code makers took the maximum number of amperes that could be

carried on the wire without raising the temperature to a dangerous point and without regard to any loss of current brought about by the resistance of the conductor.

Since practice of using these tables is so prevalent among our contractors, I have worked out a concrete example which I think will bring a more definite understanding of the importance of ample carrying capacity to an adequate job of wiring.

For this problem we will assume a storeroom which is 20 ft. wide and 100 ft. long with a show window across the front. This store is to be used for a men's furnishing goods house and will require nine 300 watt units consuming 2,700 watts per hour.

If we space the two end units 6 ft. from the end walls and the units in between on 11 ft. centers, with four 300-watt units to the circuit, and allow an additional 10 ft. to the service cabinet, we find that the load center for the first four units from the front, which we will designate as circuit A to be equal to 37 ft. To deliver the current to the lamps with a loss in voltage of two volts or less, we find, that if we allow a drop of  $\frac{1}{4}$  volt in the busses and branch cutouts of the cabinet and  $1\frac{3}{4}$  volts drop in the rest of the conductor that this conductor must have an area of 11,085 c. m. which is just 704 c. m. larger than a No. 10 wire. Since good practice dictates the larger wire we should use the size larger or No. 8 which will give a drop of 1.42 volts.

The next four outlets, or circuit B,

will have a load center of 42.5 ft. and to meet the same conditions as circuit A will require a wire cross section of 5,456 c. m., which is in between No. 14 and No. 12 wire. As before we should take the larger or No. 12 wire which will give a drop of 1.7 volts.

The remaining outlet is on the circuit with the office and showcase lighting, and for this circuit we will assume a load center of 35 ft. which will require a wire of 4,280 c. m., which is only 180 c. m. larger than No. 14. Therefore No. 12 should be used which will give a drop of 1.39 volts.

For the sub-feeder to the windows we will use a conductor that will deliver the current to the fuse center, located just outside of the windows, with a drop of  $\frac{3}{4}$  volts which with the  $\frac{1}{4}$  volt drop in the main cabinet will give us a drop of 1 volt to this fuse center and allowing one volt drop in the branch circuits we will be able to keep to the 2 volt drop.

Since we have a 3-wire cut-in we will make this sub-feeder a 3-wire circuit and since to properly light these windows there will be required thirty-two 150-watt lamps on 12 in. center we will have 32x150/230 or 20.8 amp. to be carried to a distance of 114 ft. This will require a conductor with an area of 66,479 c. m. or a No. 2 wire.

We have now laid out this job, in a way, that compared with the average present day practice, is generous in the amount of copper while the drop in voltage will be less than the customary



2 volts. So we will now check up on this job to see how much these small losses will amount to over a period of a year.

The total load on circuit A is  $1,200/115=10.4$  amps. The resistance of the conductor is .1092 ohm. Therefore the  $I^2R$  loss = 11.9 watts. With an assured use of 10 hours daily for 310 days in the year the annual loss will amount to 36,890 watt hours or 36.89 KWH, costing, at 9 cents per KWH, \$3.31 per year.

For circuit B we find that we will have a  $I^2R$  loss of 5.7 watts which over an assumed period of 10 hours daily and every day in the year will amount to 17.6 KWH, or an annual loss of \$1.58.

For circuit C the loss will be 10.5 watts which will cost \$2.92 per year. For the sub-feeder there will be a loss of 14.5 watts, amounting to \$4.67 per year and for the four branch circuits a total annual loss of \$4.68. Thus, though this job is so wired that the drop in voltage does not exceed 2 volts, there is an aggregate resistance loss of \$16.57.

Now assuming specifications on this job merely require conformance to the Code, the contractor follows the rules strictly. Since no circuit has over 1,200 watts No. 14 wire is used for all branch circuits. Since the feeder for the windows is just .8 amp. over the capacity of a No. 12 wire he uses the No. 10 and is within the Code. Now let us see what the results will be.

Circuit A will have a drop of 4.7 volts and an  $I^2R$  loss of 114.7 KWH per year, costing the occupant of the building \$10.32 as against \$3.31 for the larger wire. If the voltage at the meter is 118 volts and all of the fixtures have 115-volt lamps there will be a loss in light for this circuit of four 300-watt lights of 14.5 percent or 1,248 lumens. In order to bring the intensity up to the required 8 ft. candles another unit of 100 watts will be required, which operating on the basis of 10 hours per day and 310 days per year will use 186 KWH per annum and add \$16.74 more to the annual loss from circuit A, making a total annual loss for the circuit of \$26.91.

#### Difference in Cost

Since we now have the losses which will occur on circuit A when wired with both No. 8 and No. 14 wire let us now find the difference in the cost of the two installations. The total length of the

circuit is 104 ft. and to make the installation, using two No. 8 wires in  $\frac{3}{4}$ -in. conduit, will cost \$44.03. To make a similar installation, but using two No. 14 wires in  $\frac{1}{2}$ -in. conduit will cost \$33.86. This makes an increase of \$10.17 for the No. 8 wire. On the other hand, the No. 8 circuit shows a current loss of \$23.60 less than the No. 14 circuit. Therefore with an investment in this case of 25 percent more in copper the occupant of the store could have saved well over 200 percent of the extra cost in the first year.

Circuit B and C being short, the loss of light will not be so serious, so we will go on to the window lights.

#### Window Lights

A No. 10 3-wire feeder to the window panel will have a drop of 6.1 volts and, with a drop of 1 volt in the branch circuits, we will have a total drop of 7.1 volts which will give us a total  $I^2R$  loss of 119.4 watts which will cost \$30.32 per year. There will be a loss of light of 17.2 percent or 384 lumens per lamp or a total loss of 12,288 lumens which means that the equivalent of five and one-half 150-watt lamps will be required to bring the intensity of the window up to the desired standard. This will add \$216.15 to the annual bill, making a total loss for the windows of \$291.47.

Neglecting circuits B and C this gives us an annual loss in light and energy of \$318.31.

Now, right at this place, let us for just a few moments suppose that Bill Brown was also figuring on this job and when Bill came to the sub-feeder for the windows he, being rather inexperienced and at the same time rather anxious for a job, reasoned this way; that .8 amp. is such a small matter it is really foolish to run No. 10 wire when there is less than an ampere over the capacity of a No. 12 and by using No. 12 wire he could cut the price \$1.71. If Bill gets the job what does the customer get? On checking up we find that the No. 12 wire will give us a drop of 9.42 volts without the 1 volt drop in the branch circuit and an  $I^2R$  loss costing \$46.44 per year. To make up the loss of light nine more 150-watt lamps would be required and these would cost \$432.54 per year for current which added to the \$46.44 of energy loss makes a total annual loss for this window of \$478.98. This added to the loss already sustained in the general illumination leaves a total annual loss to the

occupant of this store \$505.89. Bill got the job for \$1.71 less, but the customer paid some freight!

With these figures before us it is very evident that it is time that something be done to improve the average electrical specification, and it is also evident that the electrical contractor who is not capable of calculating the size conductor to be used on his work is working a hardship on the contractor who does know and wishes to give his customer the kind of a job that will be the best for him in the end.

Besides he cheats himself out of a large portion of his legitimate profit, and cheats his customer by not giving him what he should have.

Because you are an electrical contractor the customer comes to you instead of going to some other tradesman on the supposition that you know best what to do and how to do it and he is depending on you for results. Are you living up to the trust which you have taken on?

#### Sub-Sellers

Edward G. Jay, manager, Metropolitan Electrical League of Boston, lambasts what he calls the "Sub-Seller" contractor in a recent issue of the M. E. Logram, saying:

"We hear a lot about inadequate wiring. How about inadequate contracting? It has been said that there are actually electrical men still alive who circulate among architects and builders to show them how to *cut down on electrical plans!* Talk about inadequacy. These men are the lowest of the low, they're 'sub-sellers.' If such a man were in the lumber business he'd probably recommend pine floors instead of hardwood. If a furniture dealer, he might tell his client that a deal table would hold up his corned beef and cabbage just as well as mahogany. Perhaps if he were a plumber he would praise the virtues of the old tin tub or even delicately remind the modern home owner of the sanitary qualities of the small frame building formerly located too near the well in the back yard!

"A 'sub-seller' is a man haunted by the spectre of crazed competition. Help lay this ghost by modern merchandising methods. Every home owner wants a fully electrical home—don't cheat yourself out of a fair profit and your client out of electrical conveniences."



## Improved Designs for

# Stage Lighting Equipment

A Comparison of Old and Modern Practice, the Requirements of Various Kinds of Equipments, and the characteristics of Modern Designs

**I**N GENERAL, stage lighting practice in the past has been characterized by rows of low-wattage lamps in troughs which contribute very little to the effective utilization of the light. The modern practice is to use higher wattage lamps, each with its individual reflector, designed to direct a maximum amount of light where it is needed. Many acts are presented in front of the first drop—"in one." Since the stage apron usually opens beyond the proscenium arch none of the overhead lighting is available for these scenes. Foot-lighting has, therefore, assumed great importance; it must furnish the brilliant illumination for these acts as well as supplement the other lighting in the full-stage scenes. What characteristics must the footlights have to meet these requirements?

The minimum vertical spread of light is determined by the necessity for illu-

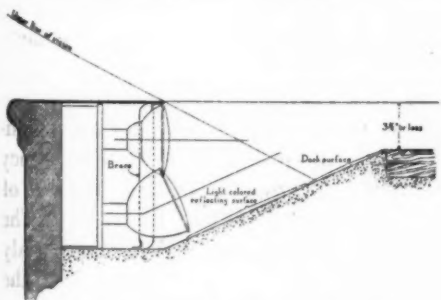


Fig. 1—A Modern Footlight Installation

minating both the head and the feet of a tall person standing on the edge of the apron (about 75 deg.) The intensity along the stage floor should be higher than at the top of this angle to display the feet of dancers at any point on the full stage.

The horizontal spread of light must be great enough so that beams of like color overlap within a few feet of the units. There must be no perceptible

shadow cast by players on a drop behind them. On the other hand, light should not spill out onto the sides of the proscenium arch.

The lighting units must be placed high enough so that the apron does not cast a shadow on the drop or on the players. On the other hand, if the units

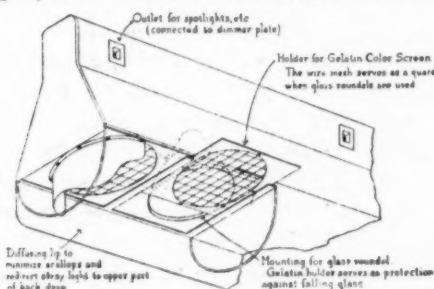


Fig. 2—Suggestions for a Borderlight

are raised too high they obstruct the view of the stage floor for the people seated near the front. With the usual stage height of about 31½ ft. this means that the top edge of the lighting equipment must be not more than 3½ in. above the stage floor. The number of units and their wattage is determined by the need for circuits in four colors (red, green, blue and amber). The equipments should present a minimum number of surfaces for the collection of dust and dirt; they should be easy to clean.

Experience has shown that from 300 to 1,000 lumens output per running foot of white light are required on various stages. The newer equipment give these values with 50 to 125 watts per running foot. Like colors should not be more than 20 in. apart and less is possible. If all the units were in one row the maximum reflector diameter should be 5 in. This is not enough to accommodate lamps of the sizes needed for the higher value of watts per foot, but a double row of units does prove feasible. The maximum diameter is then governed by the vertical space requirement which limits one to about 6 in.

Fig. 1 is a design in which these requirements of space, light, distribution and efficiency are suitably coordinated. The reflector surface should be sufficiently diffusing to give a smooth beam—a rippled or stippled specular surface (or a slightly diffusing roundel) or a reflector with a semi-matte surface such as treated aluminum. Colored glass roundels provide colors that are permanent and the roundels seal the mouth of the reflector from dust and dirt. With equipments of this design the intensity of light at any point on the stage is from two to four times that obtained with the same watts in the older types of equipment.

For a single row of footlights the reflectors should be mounted with their greatest candle power directed parallel with and just above the stage floor. Because of the necessity for sinking the footlight units below the stage level a considerable portion of the light strikes the apron. The sloping surface should, therefore, be painted a glossy white to

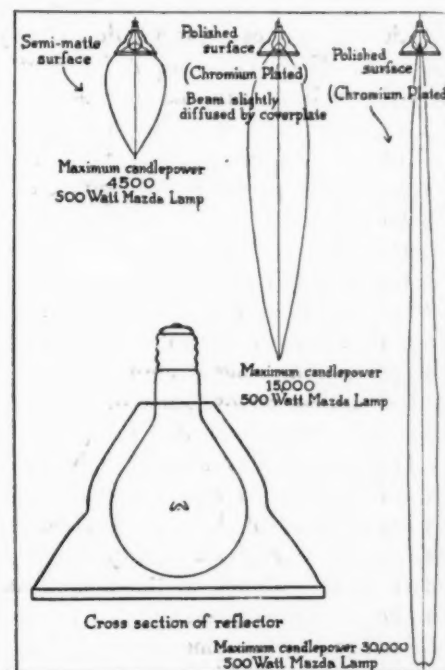


Fig. 3—Design of Borderlight Reflector

\*Presented by W. C. Brown and F. M. Falge before the Twenty-first Annual Convention of the Illuminating Engineering Society, Chicago, Ill., October 11-14, 1927.

redirect as much as possible of the light up where it is useful. However, the light colored surface must not extend so far as to be in line of vision of any part of the audience.

#### The Proscenium Border

It is highly desirable to provide overhead lighting for the acts "in one," so that shadows may be more natural than from the footlights alone, and the range of effects not so closely limited. Because the apron extends forward of the proscenium arch there are usually no borderlights above it. Floodlights or spotlights recessed in the balcony mounted in the projection booth, or better, concealed in front of convenient beams or ceiling members are the only solution to this problem in many existing houses. In new houses the arch should be projected forward of the apron so that borderlights and floodlights may be used for lighting the acts "in one;" at the same time the players in front of the curtain are still in intimate touch with the audience.

In general, one needs more light upon the players than on the drop behind. At the same time the drop and the other vertical surfaces on the stage should be smoothly lighted. These conditions are met with units of proper characteristics, mounted overhead on bridges at the front or along the side of the stage, or suspended in rows between the drops overhead. The equipments should meet the following requirements:

To light the back drop smoothly the vertical spread of light should be very narrow. However, since it is usually desired to illuminate the faces and figures of players to a higher intensity, a somewhat greater spread is advantageous. The proximity of drops to any row of borderlights unfortunately makes it necessary to direct the beams almost straight downward. A bridge, with an attendant, makes a more rational direction of the light possible; further developments in stage rigging practice will doubtless remove some of the present limitations on borderlight practice.

The horizontal spread of light must be sufficient for the beams of light color to overlap so that the individual beams are not apparent on the drop which is often visible almost to the heights of the borders themselves.

Each row of equipments should be as narrow as practicable to leave as much free space as possible for the rigging of

drops. Construction should be such that there is no hazard from falling equipment, even though inadvertently struck.

As in footlights, there is need for circuits in four colors (red, green, blue and clear or amber). This need for multiple circuits is the chief detriment of the diameter of the unit. A double row of units will bring like colors closer together and make higher intensities available, but it is open to the objection of limiting the space for drops.

The design of Fig. 3 is one that utilizes a maximum of light flux within the limitations of size and desired distribution. Units of this size in a four-color system must be mounted considerably above the visible portion of the drop to eliminate scallops from nearest like-colored units. Where a somewhat lower intensity will suffice a unit of smaller intensity will give the best results considering efficiency, space and cost. The smaller bulb permits the parabolic section to be carried back further—hence the light candle power values are obtained with a smaller diameter and since like-colored units are brought closer together they may be mounted somewhat lower. The desirable size for a 200-watt border light can, therefore, be kept under 9 in. On the other hand, for the very largest houses 1,000 watt units mounted still higher above the drops are made in diameter up to 16 in. On bridges, with attendants, these larger units are especially advantageous.

#### Borderlights

It is well to design the borderlights so that they will accommodate both gelatin color frames and colored glass roundels. Colored glass roundels provide a more nearly dust tight construction. With a construction as in Fig. 2 the wire screen of the gelatin frame protects against falling glass.

The old system of borderlights consisted of rows of low-wattage bare lights, sometimes in painted troughs. There was no particular direction to the light and often as much went upward into the flies as was downward on to the stage. Correctly designed equipment not only gives far better results, but for the same wattage provides an intensity of some three to eight times that of the old equipment.

There is often a demand for more light directed from the sides, just back of the arch, to supplement the overhead

lighting on players near the front of the stage. Units having a beam of a uniform intensity through vertical and horizontal angles of approximately 90 deg. mounted so as to be adjustable on a vertical axis are suitable for this purpose. The necessity for four color circuits again makes a small reflector diameter imperative.

#### Floodlights

Conventional floodlight practice has consisted of a high-wattage lamp in a box, the surface of which had no special contour and were generally finished in white or aluminum paint. Their inefficiency is apparent. Obviously, there is no purpose served by these old equipments that cannot be served to better effect and with lesser wattage if the old box-light containers are replaced by efficient reflectors. Although size is a factor in convenience of handling, there is not the strict limitation that obtains with other classes of equipments.

It is desirable to provide for quick and easy color changes. Gelatin screens are most practicable in this respect and it is advisable to forego dust-tight construction in favor of ready flexibility.

The principal deficiency in spotlights used today is the failure in many cases to use a mirror in those types which employ an incandescent lamp. The characteristics of the arc are such that a mirror can not advantageously be employed, but with an incandescent lamp the use of a mirror increases the amount of light in the beam by about 60 percent, and the spot is rendered more uniform. Another element of inefficiency is the use of condensing lenses of smaller diameter than necessary. The amount of light in the beam obviously increases roughly with the square of the diameter of the lens.

#### Advertising Time Switches

"Put the time switch on view in the window plus a card drawing attention to its function," is the suggestion advanced by the *Electrical Contractor*, English trade publication. "Such a procedure represents a firstclass advertisement for the electrical contractor's business and assists forward the general movement in favor of better and brighter shops and streets up to the latest hour that foot passengers are about. It is perfectly useless to preach after-closing-hour lighting to others unless we lead the fashion ourselves."



# Accounting for Work In Progress

*Study Being Made to Determine How the Contractor  
May Best Carry Work on His Books so as to Get a True  
Picture of His Financial Condition Month by Month*

**C**ONSIDERABLE difficulty is often experienced by the contractor in handling the accounting on uncompleted and partially billed contracts in such a way that monthly profit and loss statements will show the true condition of the business.

The contractor's net profit or loss in any month is the difference between the margin, or gross profit, on all the work done during that month and the overhead expenses for the same period. The calculation of the net profit in this manner is apparently a simple matter and is so in fact when all contracts are small and there are few uncompleted and partially billed jobs carried over from one month to the next. The problem is not so simple, however, when any considerable part of the contractor's business is made up of the larger class of jobs.

Contracts on the larger work invariably provide for monthly payments during the program of the work. The sum to be paid monthly is a certain percentage, most commonly 85 percent, of a more or less indefinite amount, this amount being usually taken by the contractor to be the selling price to the owner of all material delivered at the job and all labor furnished. As a matter of fact, it is common practice for the contractor to bill each month such an amount on the job as he considers reasonable.

## Seasonal Problems

Under these circumstances the following conditions may, and often do exist. During the early part of the year the contractor is starting a number of large jobs and finds it impossible or inexpedient to ask for partial payments which will cover the bare cost of labor and material. Later on, the deficiency in the billing is made up and some of the jobs are completed each month so that a final billing can be rendered. During a part of the time the total monthly billing is little, if any, more than the

amount actually expended for labor and material; during certain other months the billing is abnormally high in proportion to the labor and material cost. Such a situation gives rise to several problems.

During the time when much work is underbilled in a certain month the total gross profit may be much less than the overhead expense, therefore a monthly statement made up according to the simple rule given above will show the business operating at a net loss. Evidently such a statement provides no information of any value, for the contractor is working a full crew of men on work which, presumably, he is confident will prove to be profitable.

Again, in some later month, three or four large jobs are completed and on account of the low billing on these jobs in the early months and the 15 percent held out until completion the billing is abnormally high and shows an excessive profit.

## Conservative Practice

These conditions are aggravated by the ultra-conservative practice sometimes followed of including in the "Sales Billed" the billing on completed work only, requests for partial payments on uncompleted work not being considered as a part of the billing. The argument advanced in support of this method is that the cost of a job is an unknown quantity until the work is completed; a job may have every indication of being profitable until it is practically completed and then may show a loss on account of some unforeseen combination of circumstances; therefore, it is argued, the cost and billing of the work should not be taken into account in the bookkeeping until the job is finally completed.

The purpose of an accounting system is to provide the manager of the business with certain information which must be available in order that the business may be managed most successfully.

All the essential facts must be shown in a statement made up, preferably, once a month in such form that the manager or owner can in the least possible time get a mental picture of the true condition of the business, and it is equally important that he be able to determine the *trend* of profits and those items most directly affecting profits. He must know not only where the business stands today, but in what direction it is moving; are net profits holding up well, or are they showing a decided downward tendency? If the latter condition exists the more quickly it is discovered the better. A slight indisposition in a business may usually be easily checked in its early stages, but may rapidly develop into a serious illness if not treated when the first symptoms appear.

## The Monthly Statement

It is obviously most important that the monthly statement from which the manager or owner of the business draws his conclusions shall present a true picture of the facts, and shall not be fictitious or misleading in any respect.

Whenever a normal amount of work is in progress expenditures for overhead are necessarily up to the normal figure. This expense must be met out of gross profits. In order that the present conditions and the trend of the business may be clearly shown by each monthly statement all work in progress must be made to bear its proportion of the overhead. The problem is therefore to employ such accounting methods in handling work in progress that each month a gross profit will be shown on this work sufficient to pay the overhead expense chargeable to the work, for otherwise the indications of the business compass will be erratic and unreliable.

The contractor must first decide whether or not his business is of such a nature that the monthly profit or loss shown by his books is a fictitious and misleading figure, using the simple accounting method of deducting cost

from the billing to find the gross profit.

Next, is it a satisfactory condition for the business, because of work in progress and uncompleted, to show on the books "in the red" during certain months and in the months with an abnormally high profit, or would it not be better to adopt a method of handling work in progress which would show the true profit or loss of the business each month?

Several questions arise relative to the details of the method of handling work in progress. When the contract calls for partial payments of calculated amounts less a retained percentage, what is the "amount billed?" Is this amount to be the total figure before deducting the percentage, or is it the net amount remaining after the deduction is made?

What is the proper form of the bill to the customer for partial payments?

What method can be used to show each month the ratio between totals of costs and amounts billed?

What "volume" figure can be made up which will indicate just how active the business is?

What figure will show the true relation between the overhead expense and the activity of the business?

If all uncompleted work is to be made to bear its proportionate share of the overhead, what accounting routine will best accomplish this?

As an alternative plan, is it better to depend upon supplementary figures, not produced by the regular accounting system, to determine the true condition of the business?

If so, what figures will best serve this purpose?

Is it in fact a safer and more conservative business practice to show no gross profit on any job until it is completed, rather than to let that job carry its own overhead month by month and so bring out the true condition of the business?

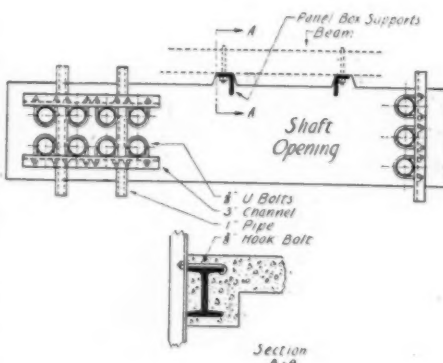
Contributions from our readers on this subject will be welcomed.

## Electrical Shaftway Practice

A SIMPLE and effective method of supporting heavy vertical conduit runs in electrical shaftways of tall buildings is shown in the sketch. A 3-in. channel is run parallel with the largest number of conduits. The conduit is then clamped to the channel with  $\frac{3}{8}$  in. U-bolts. U-bolts make very positive supports as any switch board pipe frame will demonstrate. Where the channel runs in direction of the short dimension of the shaft opening the channel is made long enough to rest on edge of the opening, as shown in the sketch. Where the channel runs in the direction of the long dimension pieces of 1 in. pipe are first laid down as supports. The channels, of course, are on the outside of the run because the nuts for the U-bolts are then accessible but this arrangement also puts lower bending strains on the pipe carrying the channel. The group of conduit on the left of the sketch illustrates this. Where the span is greater than a 1 in. pipe will safely carry, structural shapes such as channels or I beams can be used.

Cable support boxes are installed in these shaftway risers at intervals depending on the size of the conductors contained in the conduit. Where ever

possible the boxes are so spaced that uncut lengths of conduit can be used, or if that is not possible, so located that a 5 ft. length can be used thus requiring only one cut for two nipples. One conduit support for risers is placed on the floor directly below the upper box, one directly above the lower box.



Intermediate supports are provided at intervals not greater than two floor heights. The cable support boxes are usually not independently supported but rest on the lower locknuts. The cables are carried by cable supports which rest on the end of the conduit. Thus weight of the box and that of the cables is transmitted to the conduit, which in turn passes the load including

its own weight on to the conduit supports.

Riser conduits are usually installed before the enclosing partitions are put up. Cabinets are also often mounted before the partitions are up, because of the greater accessibility. In order to hold them in place continuous angles as shown in the sketch are run up through the entire length of shaft. Long lengths are used and splices made at random. At each floor they are clamped to the structural members which frame the shaft opening by means of hookbolts as shown in Section A-A. If these panel box angles are mounted before concrete is poured no chipping has to be done for the hookbolts.

Occasionally a few  $\frac{3}{4}$  in. and 1 in. pipes are run in the same group with large conduits. In this case the smaller conduits are firmly tied to the larger ones about every 8 or 10 ft. by means of a heavy iron wire.

## Licensing Electrical Dealers Advocated

The increasing use of sub-standard devices and materials makes extremely urgent the necessity of licensing electrical dealers, according to an editorial in the last issue of *The Electrical Inspector*, organ of the Michigan Association of Inspectors.

"The public depends on our knowledge and watchfulness to protect them from electrical hazards," the editorial states, "but do not stop to consider that a saving of a few cents in the price of the device desired may cause a serious accident or fire. To properly educate the public regarding electrical hazards would be as easy as trying to count the drops of water flowing from a faucet, so the only constructive method of real protection is to restrict the distribution and sale of electrical devices and material to persons or firms qualified by license or registration, said license or registration contingent on the distribution and sale of approved apparatus.

"Therefore, it is our duty to humanity to use all our efforts to bring about such a license or registration and make it a state requirement.

"Many cities have adopted such a law, but if it were state-wide, how much more good it would do, so talk this over with your friends, not necessarily electrical men, sell them on electrical safety, and we will soon have the desired protection."



# Progress Toward a New Code

**A**FTER four days of arduous labor the Electrical Committee found it necessary to adjourn without completing the task of revising the National Electrical Code. Throughout the meeting there was evident a most earnest and sincere desire on the part of the entire committee to discharge their obligation to the industry and the public by producing a thoroughly good Code. A large amount of ground was covered, but on account of the great mass of new material submitted by the article committees it was a physical impossibility to complete the work. The sessions were held in New York City on Feb. 14, 15, 16 and 17.

The following articles were considered in detail and passed upon by the committee:

## Article

- 1—Definitions
- 2—General
- 3—Outside Supply Lines
- 4—Services
- 6—Conductors
- 7—Outlet Boxes and Cabinets
- 8—Automatic Protection of Circuits
- 9—Grounding
- 10—Rotating Machinery and Control Apparatus

A part of Article 5—Wiring Methods—was also given detailed consideration and acted upon by the committee.

## More Time Required

When it became evident that a much longer time than the allotted four days would be required for a full and complete discussion of all the reports, it was decided to confine the discussion to general principles. Reports on the following articles were presented in outline and with some changes were approved in principle:

## Article

- 11—Transformers—Under 600 Volts
- 12—Switches
- 13—Switchboards and Panelboards
- 14—Fixtures, Lamp Holding Devices, Plug Receptacles, and Other Outlet Devices
- 15—Lamps
- 16—Electrical Appliances
- 18—Storage Batteries
- 30—Cranes and Hoists
- 31—Elevators
- 32—Hazardous and Extra Hazardous Locations

## HIGH SPOTS

- 1—Correlating committee appointed.
- 2—Another Electrical Committee meeting May 1.
- 3—New definitions.
- 4—Yard and festoon lighting section added.
- 5—Service rules changed.
- 6—Thin wall tubing approved.
- 7—Outlet box rules changed.
- 8—Demand factors announced.
- 9—New rule on neutral conductors.
- 10—New grounding rules.
- 11—Article 32 entirely rewritten.

- 50—Systems and Voltages of Over 600 Volts

The committee on Article 19—Lightning Arresters—proposed that the text of this article in the 1925 Code stand without change. This report was approved.

There was no discussion and no action was taken with respect to the remaining articles, which are:

## Article

- 17—Resistance Devices
- 33—Garages
- 34—Motion Picture Studios
- 35—Motion Picture Projectors and Equipment
- 36—Organs
- 37—Radio Equipment
- 38—Signs and Outline Lighting
- 39—Theatre and Motion Picture Houses
- 40—Isolated Plants
- 60—Signal Systems

After action by the Electrical Committee, proposed changes in the Code must first be submitted to the National Fire Protection Association and must then be approved by the American Engineering Standards Committee, after which the new rules become effective when published. It was evident to the Electrical Committee that under the old method of procedure at least one more long session or possibly two sessions would be necessary before their work could be completed. The net result would be no publication of the new

Code until sometime in 1929. Any such delay was considered very undesirable.

It was therefore decided to appoint a Correlating Committee, which according to the resolution may easily consist of more than 20 members, whose duty will be to prepare a new Code in form suitable for presentation to and adoption by the Electrical Committee. This involves, first, the proper correlation of the reports submitted by the various article committees; second, the ironing out, so far as possible, of all differences of opinion on all essential matters; and third, the proper wording and arrangement of all subject matter. The duty devolves upon each member of the Electrical Committee of presenting in writing to the Correlating Committee any exceptions he may take to the proposed revisions, together with his reasons therefor. All decisions already reached by the Electrical Committee will be considered by the Correlating Committee as final.

## New Meeting May 1

The Correlating Committee are instructed to report in sixty days and the full Electrical Committee will probably be called to meet about May 1. If the task assigned to the Correlating Committee is completed thoroughly and conscientiously, there will be little left for the Electrical Committee to do except to approve the report submitted to them, unless there shall be certain questions of real importance on which the Correlating Committee are unable to harmonize conflicting viewpoints and which they feel should be submitted to the main committee for final decision. It therefore seems assured that a 1928 edition of the Code will be published, provided only that the Correlating Committee finish their work in sixty days.

While any action taken so far by the Electrical Committee may be reversed at a subsequent meeting, there is every reason to believe that nearly all of the decisions arrived at during the last meeting will stand without change. The following resume covers the substance of the rules which the committee has adopted and which will in all probability appear in the new Code.

## Article I—Definitions

A number of new definitions were

adopted which will help to clarify the text of the other articles. The most important action taken was the passage of a motion to enlarge the Definition Committee to make it representative of the several groups of the industry and to instruct this committee to invite other interested bodies to cooperate with a view to the standardization of definitions.

#### Article 2—General

The antiquated recommendation that conductors be always treated as bare is stricken out.

#### Article 3—Outside Supply Conductors

The scope of the article is defined as applying to overhead supply conductors run between buildings or upon building walls, or which connect with interior wiring systems or which may come in contact with such wires.

A section on yard lighting was added, and another on festoon lighting. The latter provides that conductors shall not be smaller than No. 14, shall be rubber covered, and may be fused in accordance with Column C in the table of carrying capacities. Sockets must be of moulded composition with soldered connections.

#### Article 4—Services

The minimum size of service wires is changed from No. 10 to No. 8. A bond not smaller than No. 8 copper must be installed around any section of flexible conduit introduced into a run of rigid conduit containing service wires. In a building served through 2, 3 or 4 meters from one service not exceeding 150 volts to ground, the service conductors may run direct to a separate switch and cutout for each meter. If there are more than 4 meters a main entrance switch must be installed. Service conductors, installed either as knob and tube work or in conduit, shall not be run concealed in the open spaces in a frame building.

#### Article 5—Wiring Methods

The present Code rules for knob and tube wiring are to stand without change.

A bare grounding wire may be installed in the same metallic conduit with other conductors having insulating covering. It was made a rule, instead of a recommendation as formerly, that the combined cross-sectional area of all wires in a conduit shall not exceed 40 percent of the cross-sectional area of the conduit.

The old rules for wood moulding are to be retained, that is, the use of this obsolete method of wiring is still to be approved.

Surface metal raceways may not be installed where exposed to severe mechanical injury or corrosive vapor, nor in hazardous or extra hazardous locations. The largest size of wire permitted in the raceway is No. 10, except that special approved raceway so marked by the manufacturer may contain No. 8 wire if not fused to more than 30 amp. Where wires are laid in place the space occupied must not be such as to prevent the easy closing of the raceway. When the wires are fished in they must not occupy more than 60 percent of the space. The maximum number of wires in any case is 9.

In combination surface metal raceways for lighting, appliance and signal circuits no wire larger than No. 14 may be installed.

A much-discussed point relative to armored cable is made somewhat more clear by stating that a lead sheath is not required when the cable is "imbedded in or laid against" a brick wall, unless the wall is continuously damp.

Underfloor raceways are barred from corrosive, hazardous and extra hazardous locations. They will be permitted to contain No. 8 wire as a maximum size.

Thin wall metallic tubing may be circular in cross-section, may be made in four normal sizes, viz:  $\frac{3}{8}$  in.,  $\frac{1}{2}$  in.,  $\frac{3}{4}$  in. and 1 in., and shall have the same nominal internal diameter as the corresponding sizes of rigid conduit. It must be identified in some manner to distinguish it from rigid conduit. All fittings must be of the threadless type. It may contain no wire larger than No. 8 and no wires having a voltage between them greater than 300 volts or more than 150 volts to ground. The tubing must be installed as a complete system without wires, must be continuous from outlet to outlet, and shall not be imbedded in masonry or concrete during the course of construction nor in cinder fill. The installation of this material concealed in the open spaces in frame buildings is considered satisfactory.

No consideration was given to the sections of the Article 5 Committee's report dealing with non-metallic sheathed cable, bare conductor wiring, area limitation for various types of circuits, demand factors for range instal-

lations and power installations, appliance circuits and special appliance circuits.

#### Article 6—Conductors

A new table is included giving the insulation thickness for varnished cambric covered wire, which is made slightly less than the thickness of rubber insulation. In the table of carrying capacities the word "table" will be changed to "column" in the column headings now reading, "Table A," "Table B" and "Table C." All rules for the installation of conductors are omitted with the intention that they shall be included in Article 5.

#### Article 7—Outlet Boxes and Cabinets

A new rule provides that outlet boxes for concealed work shall be  $1\frac{1}{2}$  in. deep, except that where the building structure would be injured by installing such a box the depth may be reduced to  $\frac{1}{2}$  in. This bars the use of outlet plates. The old rule is now omitted which allowed the box or plate to be dispensed with by permission of the inspection department. A proposal to limit the width of the opening of a bracket outlet box to 2 in. was referred to the chairman of the article committee with power. In new work outlet boxes may not be secured to lath.

#### Article 8—Automatic Protection of Circuits

The 1925 Code includes a table (Section 8050) specifying the number of trip coils required for all circuit breakers, regardless of the purposes for which they are used. This table is to be replaced by two tables; one specifies the number of "overcurrent units" for circuit breakers used for circuit protection, and a separate table gives the requirements for circuit breakers used as the running protection for motors.

The old rules for branch circuit loads and fuse protection remain unchanged, i. e., 15 amp. fuses and 12 outlets per circuit, except that the following provision is added: For "Lighting Branch Circuits" and "Combination Lighting and Appliance Branch Circuits" which do not supply greater floor areas than 1,200 sq. ft. per circuit, the restriction of 12 outlets per circuit may be waived if the connected load of each circuit does not exceed 15 amp. for a lighting circuit or 10 amp. for a combination circuit.

The tables of wire and fuse sizes for



motors which were proposed a year ago were adopted without change, except that slight changes are made in some of the fuse sizes. This is to correspond with a reduction in the number of sizes being made by the fuse manufacturers. Otherwise the tables are the same as published in THE ELECTRAGIST in April, 1927.

Demand factors may be applied to certain lighting loads. Referring to the following table, for certain occupancies standard loads in watts per square

foot are established, and all wire sizes (except for branch circuits) are determined on the basis of these standard loads, the actual connected loads being disregarded entirely in these cases. Where a limit area is given, the demand factor for the load corresponding to this area is 100 percent. The demand factor in the last column applies to the remainder of the load, i. e., to the load computed for the area in excess of the limit.

For occupancies other than those

listed above no data is provided for either standard loads or demand factor.

In using this data the area is determined from the outside dimensions of the building and the number of floors, and does not include unoccupied basements, attics and open porches.

As an example of the application of this data, a hotel has a total area of 150,000 sq. ft. and contains a ball room occupying 4,000 sq. ft. The actual load in the ball room is 10,000 watts. As per the table, the standard load is 1 watt per sq. ft. and the limit area is 10,000 sq. ft. To determine the size of the service conductors, the demand is found thus:

	Demand Watts
Limit Area—10,000 sq. ft., load 10,000 watts, factor 100% .....	10,000
Next Area—40,000 sq. ft., load 40,000 watts, factor 80% .....	32,000
Next Area—96,000 sq. ft. (total remaining area less ball-room) load 96,000 watts, factor 70% .....	67,200
Ball-room—load 10,000 watts, factor 70% .....	7,000
Total demand .....	116,200

To determine the size of a feeder supplying an area of 50,000 sq. ft. the computation is:

	Demand Watts
Limit Area—10,000 sq. ft., load 10,000 watts, factor 100% .....	10,000
Next Area—40,000 sq. ft., load 40,000 watts, factor 80% .....	32,000
Total demand .....	42,000

The following rule, being entirely new and of much interest, is given in full. This permits the combining of neutral conductors in some cases, also in some cases the application of a further demand factor to such a combination neutral.

#### Neutral Conductor

One neutral conductor may be employed for three sets of 3-wire or two sets of 4- or 5-wire interior feeders. Where single two-wire circuits are run from a meter bank to the premises of individual tenants, the circuits may be balanced on each side of the system and a common neutral be employed for not more than eight circuits on 3-wire direct current or single phase, and 5-wire, 2-phase alternating current, and not more than six circuits on 4-wire, 3-phase systems. All wires of the A. C. systems must be run in the same conduit. The size of the neutral and the demand factor applying thereto shall be determined as specified in the previous sections. In addition, a further demand factor may be applied as shown.

A table of demand factors for ranges was included in the approved report of Article 16 Committee but apparently belongs in Article 8. This is given in Table II.

TABLE I—STANDARD LOADS AND DEMAND FACTORS FOR LIGHTING

OCCUPANCY	Standard Load—Watts per Sq. Ft.	Limit Area—Sq. Ft. 100% Demand Factor Applied	Demand Factor for Load in Excess Area
Single Family Dwellings..... 1000 watts allowance for appliances to be added to standard load, with demand factor of 100%.	1.0	2,000	60%
Multi-Family Dwellings (other than hotels) and Apartment Hotels having provision for individual electric cooking..... An allowance of 1000 watts per apartment allowance for appliances to be added to standard loads and demand factor to be applied to this. 1 to 10 apartments..... 11 to 40 apartments..... Over 40 apartments.....	1.0	2,000	70% 60% 50%
Hotels having no provision for individual electric cooking ..... (Standard loading does not apply to ballrooms) Area from 10,000 to 50,000 sq. ft..... Area over 50,000 sq. ft.....	1.0	10,000	80% 70%
Stores (excluding case and show window lighting) ..... Counter Cases—25 watts per linear foot. Wall or Standing Display Cases—50 watts per linear foot. 100% Demand Factor for all loads.	2.0		
Show Window Lighting—200 watts per linear foot measured horizontally. 100% Demand Factor for all loads.			
Office Buildings .....	2.0	10,000	70%
Industrial Commercial (Loft) Buildings. (A building of more than one floor, used for manufacturing or merchandising, occupied by more than one tenant.) 100% Demand Factor for all loads.	1.0		
Garages, exclusive of machine shop and display rooms ..... 100% Demand Factor for all loads.	.5		
Hospitals, exclusive of operating rooms and X-ray department .....	.75	25,000	60%
Schools .....	1.5	10,000	50%
Storage Warehouses .....	.25	50,000	50%
Factories— (A building or portion of a building occupied by one tenant and used for manufacturing.) No standard load. No Demand Factor data.			

System	Current Load in Outside Conductors After Applying Demand Factor	Further Demand Factor for Neutral Conductor
3-wire, D.C. or one phase, and 4-wire, 3-phase .....	0 to 200 amperes	100%
3-wire, D.C. or one phase, and 4-wire, 3-phase .....	above 200 amperes 0 to 200 amperes	70%
5-wire, 2-phase .....	above 200 amperes	140%
5-wire, 2-phase .....	above 200 amperes	100%

The effect of all the demand factor rules is to permit the installation of conductor sizes as determined by applying the demand factors, but in such case the inspection department takes no responsibility for the data and may require the installation of larger conductors if it is later found that those originally installed are too small to carry the actual load.

No rules were approved governing demand factors to be applied to power loads.

#### Article 9—Grounding

When an artificial ground must be used for grounding low voltage A. C. distribution circuits, and this ground is not one of a multiplicity of grounds on the same secondary, at least two electrodes must be provided, at least 6 ft. apart and having a combined area of not less than 4 sq. ft.

The proposed rules governing grounded neutrals common to both primary and secondary systems were not adopted, action being deferred pending the results of an extensive investigation of this problem now in progress.

The exposed non-current carrying metal parts of fixed equipment, such as the frames and metal exterior of generators, motors, transformers, controllers, fixed appliances, lighting fixtures, conduit, armor of cable, metal raceways, and the like, shall be grounded, with certain exceptions which are permitted only under these conditions:

- When the voltage of contained conductors does not exceed 150 volts to ground.
- When the contained conductors are on grounded circuits or on circuits not exposed to voltages above 150 volts to ground.
- When the installation is not in an industrial establishment.

- When the installation is not in a moist, corrosive, hazardous, extra hazardous, or conductive location.

When all the conditions a, b, c, and d are fulfilled, the following need not be grounded:

- Service runs, under further special conditions.
- Runs less than 25 ft. in length of conduit, armored cable, raceway, etc., under further special conditions.
- Lined covers and lined shells of surface switches and sockets.
- Boxes, cabinets, outlet and terminal fittings.

The definition of "conductive locations" becomes important in connection

TABLE II—DEMAND FACTORS APPLYING TO ELECTRICALLY HEATED COOKING AND BAKING APPLIANCES OF OVER 1650 WATTS RATING.

Number of Appliances	Demand Factor
1 or 2	100%
3	95%
5	85%
7	75%
9	55%
11	48%
13	44%
15	40%
17	36%
19	36%
21	34%
23	32%
25 or over	30%

with these rules. Such locations are defined as:

Any room, all or any part of which is below the ground level.

Laundries, kitchens, bath rooms.

Ground floors of garage, stables and outbuildings with earth or concrete floors.

Rooms having floors, walls or ceilings containing metal lath, metal reinforcement or metal covering.

Any particular location so designated by the authority having jurisdiction.

A grounding conductor for grounding one of the conductors of a wiring system must be of copper. For grounding conduit or equipment the grounding conductor may be either metal pipe or copper. On systems operating at over 150 volts to ground, each conduit entering outlet boxes, cabinets and similar equipment must be secured thereto by means of a threaded joint or by means of two locknuts and a bushing. Ground clamps, unless of a type approved for

use without protection, must be protected from ordinary mechanical injury. No. 18 wire may be used for grounding portable or pendant equipment, when the conductors to the equipment are protected by fuses not larger than 15 amp. No. 14 wire shall be used for grounding fixtures.

Portable equipment in industrial establishments must have exposed metal parts grounded, except that grounding is not required in the case of such devices as fan motors and pressing irons, and those appliances which are infrequently handled and are so located as to be out of reach and are regularly used in non-conductive locations.

#### Article 10—Rotating Machinery and Its Control Apparatus

Metal terminal enclosures are required on fixed motors when the wiring is enclosed in metal and is accessible to unqualified persons. The rules for motor disconnecting switches are reworded and considerably amplified, but apparently without making any changes of much importance.

#### Article 11—Transformers and Static Condensers Under 600 Volts

*Approved in principle only.*

It is now provided that such transformers when installed in or adjacent to a building shall be in an enclosure of fire-resistive material not communicating with the building except through openings closed by means of fire doors.

Static condensers under 600 volts shall comply with the requirements of section 5008, static condensers operating at over 600 volts.

#### Article 12—Switches

*Approved in principle only.*

It is no longer to be required that the marking on switches larger than 1200 amp. shall indicate whether the ampere rating is A. C. or D. C. Construction specifications are omitted except the tables of spacings and break distances.

Switches operating at over 150 volts to ground shall be of the enclosed type externally operable, except where accessible only to qualified persons.

#### Article 13—Switchboards and Panelboards

*Approved in principle only.*

Switchboard frames shall be grounded, except that frames of D. C. single polarity switchboards may be insulated



for the full voltage of the system in lieu of grounding.

*Article 14—Fixtures, Lamp Holding Devices, Plug Receptacles, and Other Outlet Devices*

*Approved in principle only.*

Combination gas and electric fixtures shall not be used. The specifications for lamp holding devices are changed to include fittings for the new intermediate base lamps.

Receptacles of the Edison base type shall be installed only for use as lamp holders. Receptacles installed for the attachment of portable cords shall be of a type not suitable for use with Edison base screw shells.

*Article 15—Lamps*

*Approved in principle only.*

A few changes are made in the installation rules for arc lamps.

*Article 16—Electrical Appliances*

*Approved in principle only.*

The title change from "Electrically Heated Appliances" greatly broadens the scope of this article.

Each electrical appliance of more than 20 amp. rating shall be supplied by a separate branch circuit and each such appliance shall be controlled by a separate indicating switch or an attachment plug and receptacle. The switch shall not be on the appliance, shall be accessible to the operator of the appliance, and for a motor appliance must be within sight of the appliance.

The proposed revisions of Article 5 not having been fully considered, a table was submitted by the Article 16 Committee giving allowable areas per circuit, wire sizes and fuse sizes for various types of lighting and appliance circuits in dwellings and apartments. This table is not reproduced here because it seems probable that it will be modified before final adoption.

*Article 18—Storage Batteries*

*Approved in principle only.*

Provisions are added to the present rules calling for guards for batteries and conductors when the voltage exceeds 150 volts, and for special precautions to guard against gas explosions when batteries are of more than 50 K. W. H. capacity.

*Article 30—Cranes and Hoists*

*Approved in principle only.*

New rules require that wiring not in

conduit shall be isolated, collector wires or rails shall be isolated or guarded and live parts shall be guarded.

*Article 31—Elevators*

*Approved in principle only.*

The article is considerably expanded. Most of the new rules have to do with wire sizes and wiring methods for control and signal circuits.

*Article 32—Hazardous and Extra Hazardous Locations*

This article has been entirely rewritten. Three classes of such locations are recognized:

Class I—Locations in which flammable volatile liquids, or highly flammable gases, mixtures or other substances are manufactured, used, handled, conveyed, or stored in other than their original containers.

Class II—Locations in which combustible dust is thrown, or is likely to be thrown, into suspension in the air in sufficient quantities to produce explosive mixtures.

Class III—Locations in which easily ignitable fibers or materials producing combustible flyings are handled, manufactured or used and which are hazardous only through flyings collecting on or about arcing contacts, resistors or similar parts of apparatus.

In Class I locations no service equipment, switchboards, panelboards, nor fuses shall be installed. Rigid metal conduit with vapor tight joints shall be employed as the type of wiring. Motors shall be of type approved for use in explosive atmospheres. Controllers, switches, circuit breakers, etc. which tend to create sparks or high temperatures shall not be installed unless of the vapor tight or oil immersed type. Lamps shall be enclosed in vapor tight globes and protected by metal guards. Portable cords shall be Type S or Type PA with an extra conductor for grounding. Receptacles and plugs shall only be used when so combined with an explosion proof switch that the plug cannot be removed while the switch is in the "on" position. All equipment shall be grounded and the locknut-bushing type of contact shall not be depended upon for bonding purposes.

In Class II locations service equipment, switchboards, panelboards and fuses must be enclosed in dust tight

metal cabinets. Rigid metal conduit shall be employed as the type of wiring. Motors must be of special types approved for use in these locations. Controllers, switches, circuit breakers, etc. which tend to create sparks or high temperatures must be enclosed in dust tight metal cases or be of the dust tight oil immersed type. Lamps shall be enclosed in dust tight globes. Receptacles and plugs are the same as for Class I except that a dust tight switch is specified. Portable cords shall be Type S or Type PA with an extra conductor for grounding. The same provisions for grounding apply as in Class I.

In Class III locations the requirements for service equipment, etc. are the same as for Class II except that cabinets may be merely "tight" instead of "dust tight." The same modification applies to controllers, switches, etc. Wiring must be in rigid conduit. Fixed lamps must have dust tight enclosing globes when there is a possibility of flyings or lint collecting about the lamps. Portable lamps must have dust tight enclosing globes and metal guards. Portable cords shall be Type S or Type PA with an extra grounding conductor. Equipment must be grounded but the locknut-bushing type of contact is not disapproved.

*Article 50—Systems and Voltages of Over 600 Volts*

Proposed new rules for vacuum and inert-gas tube systems were discussed briefly but no final action was taken. It is proposed that wiring within reach shall be in rigid conduit, and elsewhere may be either in conduit or on insulators separating the wires 3 in. from other objects. The tube terminals must be suitably guarded. Not more than one transformer shall be dependent upon a single automatic overload protective device unless the combined load is less than 1,650 volt-amperes. Enclosures for transformers and regulating coils shall be well ventilated and shall prevent the emission of flame or sparks in case of coil burnouts, and shall be grounded. Enclosures for transformers, coils and tube terminals shall, for indoor installations having live parts exposed within the cabinet, be so arranged that the door of the enclosure cannot be opened without breaking the primary circuit.

The other sections of the report of Article 50 Committee were not considered.

# VOLUMITIS

## Diagnosis of a Disease Known as Price Cutting in Which the Sick Business Cuts Its Own Throat

By DR. E. CON TRACTOR

SEVERAL years ago some unknown inventor of catch phrases dusted off the word "Volume," gave a new meaning to it, and started something. Increasing the volume, according to the theorists who pursued this will-o'-wisp, leads to more frequent turnovers, and eventually to more profit. The idea



was that the price would be cut to induce more people to buy the article, whereupon, although the profit on each item was reduced, the total profit would be increased.

A great many electrical businesses today have swallowed the germ and VOLUMITIS is the profit-wrecking disease which has resulted. A pencil, a pad of paper, and a small amount of figuring show clearly some aspects of the volume theory which are not frequently discovered until the patient is dead.

For example: An electrical contractor decides he would like to make a profit of \$4,000 a year from his contracting business. By using arbitrary figures that are easy to work with the problem is examined, although the situation is just the same if actual figures are used.

It would be possible to make a net profit of \$4,000 a year if this contractor could get forty jobs a year which would

cost him \$900 apiece for material, labor, and overhead, and which he sold for \$1,000 each. This would be a profit of 10 per cent on the selling price.

Thus we have: Cost \$900, Selling Price \$1,000, Profit \$100. Forty jobs at a profit of \$100 each equals \$4,000 per year profit.

Now this contractor decides he will increase his volume and turnover by cutting his price. It would be natural to suppose that if he cut his price by  $2\frac{1}{2}$  per cent he could get more than  $2\frac{1}{2}$  per cent more business and hence make more than \$4,000 per year profit. A little simple figuring, however, shows this: If he cuts his price  $2\frac{1}{2}$  per cent he will have to increase the volume by 37 per cent in order to make the same profit! Thus we have: Cost \$900, Selling Price \$975, Profit \$75. It takes fifty-five jobs at a profit of \$75 each to make \$4,000 profit per year.

And even more surprising, the amount of volume increase needed, as the price is cut, to keep the same profits develops much more rapidly than this ratio in-

dicates. For if he cuts his price  $7\frac{1}{2}$  per cent in order to increase his volume, he must get 200 per cent more jobs in order to break even! Thus we have: Cost \$900, Selling Price \$925, Profit \$25. It takes 160 jobs at a profit of \$25 each to make \$4,000 per year.

Moreover, when this contractor increases his volume to 160 jobs a year instead of forty, he increases his overhead a certain amount. The overhead has been figured in the \$900 cost, based on the forty-job figure; consequently, he does not actually make as much as \$25

on each job—in fact, it is doubtful if he makes anything at all!

A large number of business men, from the little man who sells a few lamps at cut-price to the executives of the big retail chain price-choppers, may find the answer to their newly acquired gray hairs in this disease of volumitis. All last year business looked good. The sales manager kept bringing in good-looking charts showing a 13 per cent increase in volume over the corresponding months of the previous year. But when the final inventory was complete and the auditor brought in the final statement, the president looked quickly down to the lower right-hand figure labeled: "Profit and Loss"—the amount was plainly visible in red ink.

The remedy is easier to take than castor oil. It is simply, "Take the knife away from your own throat." A big volume is fine, if sales are made at a good profit; turnover is great, if the fair, profit-making selling price is maintained. But before you go in big for VOLUME, it might be well to use



a pencil and paper and figure out just what it means. When the contractor realizes that "price-cutting" really means "profit-cutting," there'll be fewer notices like this in the papers:

**BANKRUPTCY NOTICES:** Whoozis Electric Company, liabilities \$5,631.73; assets \$13.11; diagnosis: *Volumitis*.



# Estimating Methods---IX

Residence Wiring  
Tools for Estimator  
Short Cuts

Branch Circuit Quantities  
Low Tension Work  
Simplified Labor Units

By ARTHUR L. ABBOTT

Technical Director, Association of Electragists, International

IN the first installment of this series it was stated that all branch circuit work must be laid out before any attempt is made to estimate the quantities of material and the hours of labor. The layout is a necessity in practically all kinds of work except house wiring, and even here it is desirable in some cases.

In estimating the cost of wiring in the smaller type of residences the practical fact must be considered that the job will not stand the overhead expense of making a complete layout. In this work the branch circuit material required per outlet can be calculated with sufficient accuracy from known data. The labor is hardly affected at all by small variations in the quantity per outlet of No. 14 wire, armored cable, sheathed cable or conduit, so that the time can be figured at a fixed rate per outlet.

With this exception, however, i. e., residences of a fairly well standardized type, the branch circuit work must always be laid out. As explained before, any conduit runs larger than  $\frac{1}{2}$  in., any wire sizes larger than No. 14, and any number of wires in one conduit greater than two should be plainly marked.

## Estimators' Tools

The proper equipment will save much time for the estimator and will soon pay for itself. A rather large celluloid triangle is the best form of straight-edge to use in making layouts. An assortment of colored pencils is of course required. A good rotometer is indispensable and a tallying machine or counter is very useful, the types of these instruments advertised in this magazine are recommended. A 12 in. draftsman's scale is needed, and should be the "opposite bevel" type, having only two scales, one for  $\frac{1}{8}$  in. and  $\frac{1}{4}$  in. to the foot and one for  $\frac{1}{2}$  in. and 1 in. to the foot. Avoid the triangular type of scale; it is invariably wrong

side up and is a time-killer, a cause of errors and an all-around aggravation. Some common white chalk should be provided. If the estimator wishes to keep a record of his work and cannot retain the blueprints, he will also need a large drawing board, thumb tacks and a supply of tracing paper. The tracing paper should be quite transparent but need not be of an expensive quality because the layouts made on it have no permanent value.

## Use of Rotometer

The lines drawn on the blue-prints or tracing paper represent the horizontal distances between outlets and these distances can be accurately measured by running over them with the rotometer. Vertical lengths of conduit cannot be shown on a floor plan but must be measured also. The following is a simple and accurate method of including these verticals. At any convenient point on the plan, preferably near a cabinet, draw a line and mark off on this line a distance representing the height from floor to floor, using the same scale as that of the plan. Also lay off on this line the heights above the floor of a bracket outlet, switch and any other outlets in walls, and the position of the top and bottom of the cabinet. Then when any run is found such as a drop from the ceiling outlet to a switch which includes both horizontal and vertical distances, first run the rotometer over the line between the two outlets and then over the distance representing the vertical length.

In some types of floor construction the conduit must be bent and enter the back of a ceiling outlet box and there is a small vertical length used at each such "pipe entrance." This length may be as small as 6 in. or even less. After the pipe entrances have been counted it is a simple matter to multiply the total number by the vertical length each requires and add the result to the conduit length measured by rotometer.

Convenience outlets may be anywhere from 6 in. to 18 in. above the floor and it is rather troublesome to transfer the rotometer to the line on which the verticals have been laid off each time a rise to such an outlet is required. These distances can be included with sufficient accuracy by running the rotometer wheel slightly past the outlet.

Every run, i. e., every line between two outlets, should be checked as soon as it has been measured with the rotometer. If the layout is on a blue-print, check marks can be made with chalk; if the layout is on white paper a colored pencil must be used. When a vertical distance must be scaled, this should be done immediately after taking the horizontal distance.

The rotometer measures the actual distance in feet and inches which the wheel has run over. This must be set down on paper, reduced to inches, and the total inches multiplied by 4 if the scale is  $\frac{1}{4}$  in. = 1 ft. or by 8 for a  $\frac{1}{8}$  in. scale.

## Branch Circuit Quantities

The form shown here is designed with columns for entering all the branch circuit quantities as they are taken off the plans. One line across the sheet is intended to be used for the total quantities on one floor of the building and this is the best method to follow in most cases. Some estimators prefer to take off and enter separately the quantities for each complete run to a cabinet, but this requires a large amount of extra time with no commensurate gain; the estimator who has this extra time at his disposal can employ it more profitably in other ways.

The five columns at the right hand end of the form are for various combinations of conduit and wire and the headings are to be filled in to suit the conditions. In measuring the conduit lengths with the rotometer, the total length should be found for all  $\frac{1}{2}$  in. conduit containing either 2 or 3 wires.

This quantity should be entered in the first "Conduit and Wire" column and at the head of this column the notation "1/2 in.—2 No. 14" should be made. In the same way 3/4 in. containing 4 No. 14 wires and 5 No. 14 wires should be scaled off together and the total length entered as "3/4 in.—4 No. 14." The last column is headed "Odd Wire" and the rotometer is again run over all lines marked as containing an odd number of wires and the total feet is entered on the form. This provides with a minimum amount of labor all data necessary for determining the total quantity of branch circuit wire.

If there is any considerable quantity of wire of any other size than No. 14, such runs should be scaled off separately and entered in columns with suitable headings.

The general procedure will then be as follows: Scale off with the rotometer all runs of 1/2 in., then all runs of 3/4 in., and finally the 1 in. if any is to be used, and then measure the length of odd wire required. If check marks have been made with chalk they can now be wiped off with a cloth. Next take the tallying machine in the left hand and count the outlets of each kind as they are checked with chalk or a colored pencil held in the right hand. Then using the tally and checking in the same manner, count the pipe entrances.

After all quantities for each floor have been taken off, entered on the form and totaled, some allowance should be

added to most of the items. As in the case of large conduit and wire, the estimator must use his own judgment in making these allowances. In the sample form shown here, the conduit allowances added are approximately 2 per cent, adjusted in each case to bring the total up to a round number.

On the form shown it will be noted that some of the conduit quantities have been multiplied by the number of wires contained to find the total length of wire. Also, there being two items of 1/2 in. conduit, these have been added together to find the total. It is much the best practice in every case to arrive at the final figures on this sheet, then in checking back at any time each figure appearing on the pricing sheet may be found on the schedule sheet.

Convenient spaces are provided at the bottom of the sheet for computing the total quantity of wire and the total number of outlets of all kinds.

As noted in the last installment, it frequently occurs that two or more classes of floor construction are found in one building, and whenever there is any considerable amount of conduit work in any one class the quantities should be taken off and entered separately on the schedule sheet.

The form illustrated has been very widely used for a number of years and has proven very satisfactory for the general run of jobs from the smallest up to a limit of about \$50,000 and can often be used for still larger jobs. As

a rule however a larger sheet is needed for a very large installation. A suitable form has been designed for this purpose but has not been published because the demand for a form of this kind is naturally somewhat limited.

#### Taking Off Low Tension Work

The runs built into the floors and walls for low tension systems are in most cases taken off in the same manner as the lighting branches. It is best to use a separate sheet of Form 1 for each system. There are certain exceptions to this procedure, in general, those systems in which the branch runs do not radiate out from a common center on each floor. For example, a school building may have a clock and program bell system for which several conduit runs start from one center and ramify throughout the building in zig-zag fashion. For such a system the runs should be laid out on the floor plans and a diagram of the entire system should be drawn showing for each run the conduit size and the number and size of wires. Horizontal distances should be scaled from the floor plans and marked on the diagram. The quantities may then be taken off and entered in the most convenient manner on Form 3 (illustrated in November installment).

#### Simplified Labor Units

The method which has been explained for estimating labor on branch conduit and outlet boxes is without question entirely logical and if the proper study of actual production rates is made so that the units can be checked, will always be the most accurate method. Some estimators, however, are more concerned with quantity production (of estimates) than with accuracy, and seem to feel that it is a great burden to count all pipe entrances and use these quantities in the labor estimate. A simplified method has therefore been worked out which, so far as it has been possible to determine, gives results closely approximating those obtained by the regular method.

A study was made of estimates of 11 jobs, varying in size from a few hundred dollars to \$150,000, and including various types of layouts. It was found that the averages for all these installations were 2.1 ceiling pipe entrances per ceiling outlet and 1.8 wall pipe entrances per wall outlet. The corresponding labor is added to the outlet labor, assuming that all pipe entrances

Form 1 BRANCH CIRCUIT SCHEDULE														
JOB <u>Grand Hotel</u>										ESTIMATE NO. <u>1</u>				
OWNER <u></u>										SHEET NO. <u>1</u>				
ADDRESS <u></u>										DATE <u>3-6-25</u>				
WORK <u>Lighting</u>										SCALE <u>1/8"</u>				
ESTIMATED BY <u>J.D.</u>										CONDUIT AND WIRE				
PIPE ENTRANCES										CEILING				
WALL										WALL				
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are  $\frac{1}{2}$  in. This gives outlet labor units which include the pipe entrance labor under average conditions if no conduit larger than  $\frac{1}{2}$  in. is used.

The average number of ceiling and wall pipe entrances was then found per 100 ft. of  $\frac{3}{4}$  in. conduit and per 100 ft. of 1 in. conduit. The exact figures for  $\frac{3}{4}$  in. were 5.27  $\frac{3}{4}$  in. ceiling entrances per 100 ft. and 2.52  $\frac{3}{4}$  in. wall entrances per 100 ft. Taking the difference between the labor on one  $\frac{1}{2}$  in. ceiling entrance and one  $\frac{3}{4}$  in. ceiling entrance, this difference is multiplied by 5.27 and the result is added to the labor on 100 ft. of  $\frac{3}{4}$  in. pipe. The same procedure is followed with the  $\frac{3}{4}$  in. wall entrance. A new unit is thus found for labor per 100 ft. of  $\frac{3}{4}$  in. conduit which contains an allowance for the excess labor required for the average number of  $\frac{3}{4}$  in. entrances over the labor for the same number of  $\frac{1}{2}$  in. entrances. Labor units for 1 in. conduit were worked out in the same manner.

The units produced in this manner therefore include all pipe entrance labor in the outlet units, assuming that all entrances are  $\frac{1}{2}$  in., and the  $\frac{3}{4}$  in. and 1 in. conduit units include an additional allowance to cover the average number of entrances of these two

sizes. Labor units computed by this method for various classes of construction are given in Table 7A. These figures were checked against the regular method by applying them to each of the 11 jobs studied, and the average of the results shows exact agreement with the regular method. In 8 of the 11 cases, the total branch circuit labor figured by the simplified method was within 3 percent of the labor figured by the regular method. The simplified method was 3.5 percent low on one job, 5 percent low on one, and 5 percent high on one. In each case where the discrepancy was of any consequence it was found to be due to an excess of either ceiling or wall pipe entrances above the average number.

#### Error

It is recommended that estimators who favor such a short method check the data by computing the labor on a number of jobs in both ways. If no greater difference than 5 percent is found the method may be considered fairly satisfactory. THE ELECTRAGIST will appreciate receiving reports of such check calculations.

The job factor should of course be applied in every case the same as when the regular method is used.

## Eastern Inspectors Survey Fusing

Replies to a questionnaire on aspects of the fusing problem sent out by the Eastern Association of Electrical Inspectors indicate that inspectors are dissatisfied with the present methods of fusing and believe further safeguards should be required. The questions and answers follow:

1. In branch circuits and feeders where the Code requires not over 15 ampere fuses, do you find that the present type of fuses are giving full and satisfactory protection?

Associate	Active
Yes .....11	Yes .....12
No .....21	No .....54

2. Do you find that the above fuses, after being in use a few years, are maintained at the proper value?

Yes .....7	Yes .....7
No .....25	No .....57
	Question ... 1
	In most cases .... 1

3. Do you find many cases where the fuses exceed the proper value or are strapped?

Yes .....30	Yes .....61
No .....2	No .....4
	Not many... 1

4. Do you believe that unalterable 0-15 ampere fuses not interchangeable with higher amperage type and bases which cannot be plugged or tampered with are desirable?

Yes .....30	Yes .....60
No .....2	No .....6

5. Do you believe that these "foolproof" fuses (0-15 ampere type) and bases should be required by the Code?

Yes .....30	Yes .....61
No .....2	No .....4
	Blank ..... 2

6. The Code allows approved circuit breakers to be used in place of fuses. These circuit breakers are not at present required to be non-tamperable or "foolproof". Do you believe that the Code should require them to be unalterable?

Yes .....22	Yes .....51
No .....8	No .....14
Question... 2	Blank ..... 1

7. Do you believe that rules 807f and h are sufficient as the requirements for the amount of load which may be placed on a circuit?

Yes .....16	Yes .....27
No .....13	No .....36
Question ... 2	Question ... 2
Blank ..... 1	Blank ..... 1

8. Do you believe that a more definite limit should be put on a circuit load?

Yes .....19	Yes .....43
No .....11	No .....22
Blank ..... 2	Question... 1

9. Have you experienced difficulty with lining in brass-shell sockets where used with gas filled lamps in show windows or other places where adequate ventilation cannot be secured?

Yes .....21	Yes .....31
No .....5	No .....27
Blank ..... 6	Question... 1
	Blank ..... 4
	Very little .. 1

10. Should the use of fibre or paper lining in sockets in such places be prohibited and porcelain sockets be required by Code ruling?

Yes .....22	Yes .....48
No .....4	No .....10
Blank ..... 6	Question... 2
	Blank ..... 6

TABLE 7A—BRANCH CONDUIT WORK—SIMPLIFIED METHOD

CLASS	Conduit Hours per 100 ft.			Outlet Boxes Hours per 100	
	$\frac{1}{2}$ "	$\frac{3}{4}$ "	1"	Ceiling	Wall
A—Reinforced Concrete, using deep boxes...	1.2	1.9	3.4	53	150
A1—Reinforced Concrete, with steel frame...	1.2	2.0	3.6	70	150
B—Concrete slab with concrete joists and tile filler .....	1.2	1.9	3.6	74	150
F1—Steel Pan, outlets in beams.....	1.2	1.9	3.6	71	150
F2—Steel Pan, pans left in place, metal lath and plaster, pans blanked off for outlets .....	1.2	1.9	3.6	82	150
F3—Steel Pan, pans removed, metal lath and plaster, pans blanked off for outlets .....	1.2	1.9	3.6	75	150
F4—Steel Pan, pans left in place, holes cut in pans for pipe and boxes.....	1.2	1.9	3.6	97	150
S—Suspended Ceiling work— Case 1—Pipe in slab and stubbed down to box .....	1.2	2.1	4.3	143	150
Case 2—Pipe run in ceiling space.....	1.2	1.9	3.6	82	150
D1—Wood Frame—double floor, no strips...	3.9	4.6	6.4	76	100
D2—Wood Frame—double floor with strips...	1.2	1.8	3.5	92	100
D3—Wood Frame—strips between joists and lath .....	2.1	3.0	5.0	71	100
D4—Wood Frame—conduit run in unfloored attic .....	1.2	1.8	3.5	86	100

# Wiring Depreciates As Well As Anything Else\*

Reinspection a Source of Business for Electrical Contractors, to be Had Not Through Legislation But by Insurance Cancellation

By E. A. ARTZ  
Past President, Iowa Electragists

I KNOW of no department of human endeavor where the matter of depreciation is so utterly neglected, as electrical wiring. It is conceded that in the fullness of time the house, the structure, will fall in decay, but the electrical wiring is presumed to endure to perpetuity, and remain standing there like a totem pole for the silent adoration of generations yet unborn. Inspection departments have devised an elaborate piece of machinery a visualization of which bears a striking resemblance to royalty, beginning with the kings and queens, passing on to the dukes and "dukesses" and ending with the janitor.

## Wiring Not Immortal

The thought has gone out that if an electrical installation has been given the "once over", and the fees collected, that settles it. But even tombstone men recognize that granite is not immortal and they have adopted the slogan—"Mark every grave—mark them often." Note that they say "often."

It is disconcerting to have a theory deposed by a fact. The present theory of electrical inspection is most excellent, but it fails to recognize the cold fact of depreciation. With a proper appreciation of depreciation, a new field, or rather an old field would be opened up, for the electrical contractor. In speaking of electrical contractor, I do not of course mean a favored few in our large cities who handle jobs of large proportions, but rather the rank and file of those engaged in the electrical business throughout our land who are struggling for an existence. I am pleading their cause.

It was prophesied that the automobile industry would soon reach stagnation because of saturation, there then being a car to every four or five individuals. But those who made that statement did



E. A. Artz

not take into consideration depreciation. Nowadays an enormous depreciation is meekly—one might think gladly—accepted by the automobile owner. The manufacturer of a certain popular brand of automobile in advertising the debut of a new model addressed his message, not to those who do not have them, but to those who have them. An automobile owner is a bear for depreciation.

Some time ago I sent the following questionnaire to inspection departments in various cities:

- 1—Do you attribute merit to reinspection?
- 2—What is the proportion of hazard in new work?
- 3—What is the proportion of hazard in old work?
- 4—What proportion of hazard could be eliminated by reinspection?

All answered that they attributed merit to reinspection. To my utter amazement, however, some inspection

departments came back with the question, "How can the wiring in a building be reinspected after the structure is completed?" It was necessary to advise them as follows: "Yes, we mean just that—reinspection of the wiring after the same has been in use. The electric wiring in a structure is not hermetically sealed. It is accessible and can therefore be reinspected. The initial installation follows a certain accepted trade practice irrespective of inspection. The subsequent interference with the installation often results in gross violation of that practice. The electrical installation in a dwelling is subject to interference in the attic and basement—two vulnerable and hazardous places. Moreover it is subject to interference by attaching drop cords to any outlet, and running the same across the ceiling, through partitions and along baseboards. This is especially true of commercial buildings. Electrical installations can be interfered with to such an extent that they would bear little resemblance to the original installation."

Essentially all inspection departments answered the second question by saying there was practically no hazard in new work. Some modified the statement by saying that with proper inspection there would be no hazard in new work. One department advised that any work not unlawful, could not be considered hazardous.

Essentially all inspection departments answered the third question by saying that the hazard in old work was great. Some declared that all the hazard was in the old work.

Essentially all inspection departments answered the fourth question by saying that practically all hazard could be eliminated by reinspection. Please note that the answer to the fourth question is a conclusion in accordance with the rules of logic—the major and

\* Abstract of paper presented before Des Moines meeting Iowa Association of Electragists.



minor premises being established.

In every instance, however, the conclusion was modified by a woeful acknowledgement of the inability to put reinspection across. The first law of nature was cited in several instances. The inspector could not be expected to jeopardize his position by reinspection. Rotten politics was frequently mentioned. Education was cited as a means to an end whereby reinspection could be accomplished without antagonizing the public or jeopardizing the position of the inspector. Apparently it was the first time many inspection departments were asked to face the public. Many suggested stringent legislation. I do not think, however, that relief can be secured by legislation. We are already overlegislated. The trouble is, that legislation is at once so simple and so complex that people don't understand it.

#### Legislation vs. Cancellation

However, any one, be he ever so simple, can understand "cancellation". The moment the cancellation of a man's fire insurance policy is threatened, he will have a complete, specific, and definite understanding of what you are talking about. This being the case it would be well for the Electragists to stop addressing the law makers, and cultivate the acquaintance, and ask for the assistance and cooperation of, the underwriters. Best of all, these men are well informed on the technique of electric wiring, and stand ready and willing to work in conjunction with us.

Moreover, there is a growing and well founded suspicion that legislation frequently has its inception in selfish motives, and is not entirely for the welfare of the community. Lobbying for the enactment of laws that will protect one's interests under the guise of public interests, has become a popular American pastime.

There is another and very potent reason why we should have reinspection: We are paying for it. Consider the conditions that exist in a city of seventy-five thousand inhabitants. The fees collected for electrical inspection from January 1, 1926 to January 1, 1927 were \$3,013. The fees collected for the inspection of the buildings was \$3,095. It is a matter of common observation that the fees charged for electrical inspection run neck and neck with the fees charged for the inspection of the whole structure, although the cost of

the electric wiring is about the one-hundredth part of the cost of the structure. Under the present merciless competition in house wiring, the inspection fee charged per opening is frequently

E. A. Artz, past president of the Iowa Association of Electragists, was born in Minnesota and was graduated from the University of Minnesota in 1897. The following year he received his Master of Science degree, and then the E. E. degree. His first electrical experience was with the Western Electric Company in telephone work; he then managed several central station plants in Minnesota, starting his own contracting business in Sioux City, Iowa, twenty years ago.

greater than the contractor's profit thereon.

In order to place the subject squarely before you, I make this challenge: Walk down the principal thoroughfare of any town or city, and you will observe violations of every rule in the code. The only reason there are not more violations, is not because of the limitations of capacity, but because there are no more rules to be violated. Some of these violations are intricate and refined. The number of ways a drop cord can be used by the layman is limitless. Some of the violations are gross. I recently visited a five and ten cent store and noticed that the "house electrician" had substituted pieces of fixture casing taken from a five cent counter, for cartridge fuses in the main line switch of a large panel board.

Reinspection is a crying need. It has even been suggested that the electrical inspector accompany the firemen in their periodical inspection of the downtown fire district. This system of electrical reinspection would not require law enforcement, but would reduce reinspection to a simple business proposition.

#### Effect on Insurance

A man purchasing insurance would pay much or little for it, depending upon the condition of his building. There is practically no hazard from electrical wiring *per se* in a building, but statistics show a large increase in twenty years, in spite of the tremendous development in the art of electrical wiring. The answer comes clear, there is no hazard in the initial wiring,

but by the misuse of electrical appliances, and the subsequent tampering with the wiring in a building. The electrical inspector has control over the initial installation in which there is no hazard, but has no control—yes, he would hesitate for political reasons to exercise control—over tampering with the installation, especially in the business district, or the misuse of electrical appliances, in which there is a real hazard.

The electrical inspectors have electrical contractors in control by the cancellation of their permits, but they have no such "edge" on the owner of the building. Notice that the electrical contractor understands the potency of "cancellation".

An inspector appointed by the insurance people would have the same control over the owner by threatening cancellation of his fire insurance policy. Would the owner of the building understand cancellation? I'll say he would!

#### Workers May Discriminate Against Outside Contractors

Workers may demand that outside employers pay the wage rate in the city where the work is being done, or the rate in the employer's home city if that is higher. That is the effect of a decision of the Court of Appeals of the District of Columbia, in the case of the Barker Painting Company v. Brotherhood of Painters, Decorators and Paperhangers, decided November 7, 1927.

The Brotherhood had adopted a rule that members could work for an outside contractor only if the higher rate was paid, and that at least 50 per cent of the working forces must be local men. The Barker Company objected to the rule.

The court stated: "If a contractor employs union labor upon work in his own city, he must pay the union wages of that locality, but if he moves his force of local labor to another city he may meet there with a higher or lower union wage scale, as well as with different limitations as to periods of labor. The rules do not discriminate against any particular person or place, and are uniform in their operation throughout the country. The members are lawfully entitled to obey them by abstaining from work in applicable cases if they so desire."



## Central Station Advertises Contractors

### Boston Edison Company Campaigns for More Wiring

**R**ELY on Your Electrician" is the slogan Boston people are seeing in their daily newspapers, in street cars, and on illuminated bill boards.

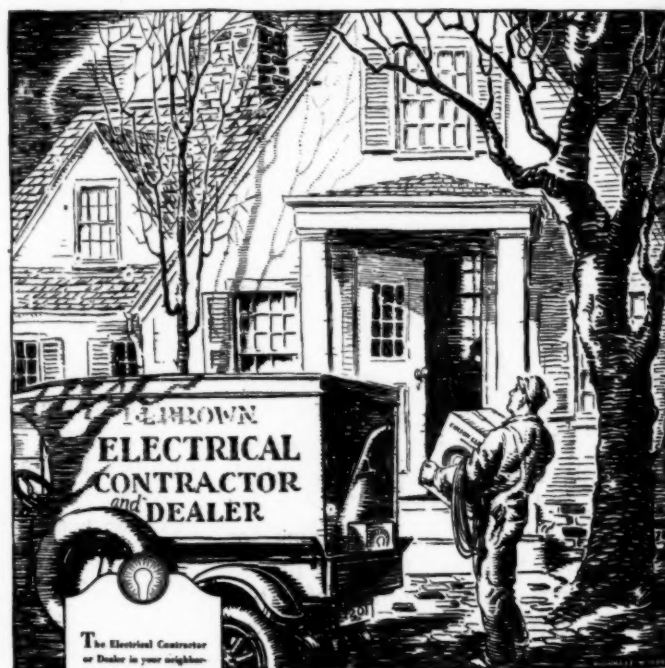
The Edison Electric Illuminating Company of Boston has started a widespread advertising campaign to sell better wiring and the electrical contractors' part in installing good wiring jobs. Full pages in daily newspapers are being used; one of the advertisements is illustrated in the adjoining column.

In addition to newspaper space, the Edison Company has put the car card, above, in street cars and has painted bill boards throughout the city with the same message.

Each advertisement features the electrical contractor and urges the householder to go to him for advice and help on wiring problems. It stresses the comfort and convenience of convenience outlets, and urges that electricians be consulted in regard to wiring, illumination, cooking, refrigeration, and appliances. In each advertisement is printed the statement:

"We are a member of the Metropolitan Electrical League and endorse its service to the public and to the electrical industry."

Many contractors are tying up with this advertising by running space of their own in local and sectional newspapers.



The Electrical Contractor or Dealer in your neighborhood is a man well worth knowing. He realizes his success depends upon his service to the community—to you. He is ready to place his experience and knowledge at your disposal—so that you may have the greatest benefit from Electricity in every way. Let him help you—consult him on all your electrical requirements.

**RELY  
UPON YOUR  
ELECTRICIAN**



## YOUR ELECTRICIAN brings you Comfort and Convenience

**Y**OUR Electrician is more than a skilled workman—he is an expert, fitted by experience to advise you in regard to Electrical Wiring, Convenience Outlets, Illumination, Cooking, Refrigeration and the scores of appliances that give you every comfort and convenience.

Let him tell you how to expand your present electrical service so that it may give you more leisure and freedom.

From the modest home in the suburbs to the largest factory in the city—Electricity is performing a useful service. Is it doing all it can for you?

Ask Your Electrician!

**THE EDISON ELECTRIC ILLUMINATING CO.  
OF BOSTON**



# What Must Be Done About the Motor Business?

## An Analysis of the Existing Situation in the Motor Business, a Discussion of the Proper Relations Between Manufacturers and Dealers, and Recommendations for Action

FULLY realizing that no relationship between the motor manufacturers and the motor dealers can long survive unless it is based upon a sound foundation of mutual understanding and profit, the California State Motor Section, of the Association of Electragists, in assembled meeting, submits to the motor manufacturers, through their representatives in attendance at this meeting, the following survey of the situation. In this report a conscientious effort has been made to appreciate fully the problem, not only from the view of the motor dealer, but from that of the manufacturer as well. Without such an appreciation, no permanent progress can be made toward the solution of the problem.

The motor dealer feels that his claim to consideration must be determined, in the final analysis, upon a basis of competency to serve. No other basis is economic and therefore no effort has been made herein to analyze the situation on any other grounds.

It will be agreed without controversy that the motor and motor accessory manufacturers desire:

### Manufacturers Desire

(1) The greatest possible development of the market for their products.

(2) Outlets which possess: (a) Character, (b) Credit standing, (c) Business and technical capacity.

Fitting them satisfactorily to: (a) Sell (b) Install and (c) Service such equipment.

(3) Protection of their policies and products and the good name of their individual institutions.

(The retirement of obsolete and inefficient equipment bearing the name plate guarantee of that manufacturer in favor of modern new equipment.)

(4) Loyalty to their products and to the furthering of those products upon the market and

(5) Adequate and satisfactory dealer

### CONDITIONS in the motor business have been very bad.

Neither the motor dealer nor the manufacturer is making any money; everyone is cutting the throat of everyone else. At the last convention of the Association of Electragists, Int., in St. Louis, some motor dealers got together and organized a motor section of the A. E. I. One of the first accomplishments of the motor section has been the conference between dealers and manufacturers of California, in a state meeting, held in Fresno, Calif., February 10 and 11. This article is the report submitted by the electragist motor dealers at the state meeting. Certain recommendations are made: **WHAT SHALL BE DONE ABOUT THEM?**  
—The Editor.

representation.

These objectives of the motor manufacturers are clearly appreciated. Moreover it is the desire of the motor dealer that they shall be realized. The State motor section, comprises motor dealers and motor specialists of California, representing a present market in excess of \$300,000.00 in motor and motor equipment sales per year. It has for one of its purposes the furthering of activities which should result in an eventual realization of these objectives.

After thorough investigation of the situation the motor section finds, instead of an accomplishment of these objectives, a general breakdown of motor distribution policies. Cold blooded analysis of this breakdown reveals that the situation has been chaotic because of very natural economic reactions. The fact that under present conditions of motor distribution the motor dealer cannot make sufficient profit to survive has killed interest in the development of the market on the part of the dealer. No other reaction can be expected under conditions which violate the one fundamental principle of

business development, the incentive to legitimate profit.

From this evidence the following causes are shown to lie at the bottom of the general breakdown of the present motor market:

(1) Too great a number of motor sales outlets.

(2) Indiscriminate direct sale of motors and equipment to users by manufacturers at discounts from published resale prices.

(3) Vague and elastic buyers' classifications.

(4) Disregard of published and established resale list prices by the manufacturers' representatives.

(5) Destruction of the morale of motor dealers because of a type of competition which forces the dealer to make corresponding discounts or lose the business, eliminating his own profits and often causing financial loss to him, which reacts to the detriment of the motor market.

### Serious Conditions

The most serious of these conditions, as brought into focus by an investigation of the situation completed by the motor section, are "the vague and elastic buyers' classifications" and "the disregard, by manufacturers, of the published and established resale list prices" The report of the committee making that investigation is as follows:

"First: Assume a motor dealer sells motors to the amount of \$7,500.00 per year. This is believed to be a fair figure. Those handling a greater volume would show a little to advantage, while those handling a smaller volume would not show up quite so well.

"Let us assume all motors to be 50 h. p. and under; of this amount 50 percent are sold at published list prices, and 50 percent at 10 percent discount. Taking the 5 percent cash discount usually allowed, and the quantity discount

also allowed at the end of the year, the gross profit is found to be \$1,206.00. Deducting from this 1½ percent credit loss, and \$12.00 per year free servicing, leaves \$1,088.00 or 15¼ percent. If a salesman were paid 7 percent commission there would be left 8¼ percent.

"Further demonstrating the low margin, let's sell 100 h. p. motor retailing at \$900.00 to a large user. First of all the dealer is billed the same amount as he bills his customer. Then if he can pay his bill promptly he takes \$40.50 discount, and at the end of the year \$19.23 more, or \$59.73 total representing 6.6 percent. If he paid a salesman 7 percent commission he has paid for the privilege of selling the motor.

"In the experience of the members of the motor section, the sale of new motors cannot be profitably developed on an overhead margin of less than 25 percent of gross sales.

"This being the case, it is unfair for motor manufacturers to expect a motor dealer to put on salesmen and exert a real effort to build up a big business in their products when the margin of gross profit is only 15 percent.

#### "Sell More Motors"

"The manufacturers continually hammer the motor dealers to sell more new motors, and occasionally assert that many motor dealers do not sell more because they are not qualified or capable.

"In all fairness, then, how can a motor dealer afford to hire a salesman at \$250.00 per month minimum, when he does not make any profit. This man will have to earn his salary by selling wiring jobs, supplies, etc., for at 7 percent he would only make \$500.00 for the year on the \$7,500.00 business.

"Further, a dealers' profit on an order of considerable size may be estimated as follows under existing schedules. Assume all motors in the order 50 h. p. and smaller:

TABLE I. Dealer's Profit on Large Order

List Price .....	\$3000.00
Selling Price .....	2520.00
Net Cost .....	2315.00
Profit .....	211.00
Profit in Percent.....	8.4%

Compare discounts on other lines handled by electrical dealers.

"The dealer has two prospects, one

TABLE II. Dealer's Profit on Other Lines

	Percent
Heating appliances depend- ing on quantities .....	30-35
Heavy duty electric heaters.30, 10 or 37	
Ranges .....	30-33½
Vacuum Cleaners .....	35
Washing Machines .....	30
Fans .....	30-35
Radio .....	30-35

for motors showing 15 percent margin, and one for any of the above articles showing 33 percent margin. It takes the same effort to sell one as the other. Naturally he will push the more profitable articles, and this is to a great degree the reason the motor manufacturers have failed to enjoy the volume of business from the motor dealers that they would like to get.

"The motor manufacturers realize that they themselves cannot sell motors profitably at list price to the small buyer, and they ask the motor dealer to handle this class of business for them.

"If the motor manufacturers cannot handle this class of business direct at a profit, how can they expect the motor dealers to do it on a gross margin of 15 percent. It can't be done!

"The instant a good sized deal comes along the manufacturers cut down the margin to 8.4 percent or less, which in turn cuts down the dealer's enthusiasm and he says, 'Oh, hell! What's the use?' If an adequate margin were provided it stands to reason that the dealers would go after the business and build up a worth while volume.

"The motor section numbers among its membership several dealers who have had experience as manufacturers' representatives and who in all fairness to the motor manufacturers, state their belief that the manufacturers are not fully conversant with the obstacles confronting motor dealers.

**A** MUCH healthier condition would follow a straightforward application of the National policies by managements definitely attempting a better dealer condition, rather than side-stepping the burdens and difficulties involved, and in many cases still persisting in those business grabbing practices which ruin dealer morale and retard the satisfactory condition awaited by the industry.

"The above facts are presented for the purpose of making clear to the manufacturers that they themselves are largely, if not entirely, to blame for the present condition of affairs. The recent policies adopted by the various manufacturers are steps in the right direction and now that the movement is started these policies should be further modified so that the motor business will be profitable not only to the manufacturer, but to the dealer as well.

"One source of considerable annoyance is the 10 percent discount to listed consumers. This classification is so vague that many of the motor manufacturers, even some motor dealers themselves, use it as a means to 'slip one over' and get the business with the result that whenever a large buyer is in the market for some motors everybody is nervously watching and fearing what the other man might do, instead of trying to sell the products on their merits. It is true that the number of this class of customer has been reduced in the past year or two, but there is still much to be done to clear up a very bad condition.

#### Re-Classify Buyers

"Many years ago a concern having 200 h. p. connected in motors was considered a large buyer. Merely as a suggestion, the manufacturers might consider revising their present so-called consumers' classification list so that only those concerns having 2000 h. p. connected in motors would be entitled to the 10 percent discount.

"In regard to repair parts there is also a very ridiculous situation. Some manufacturers recently have changed their policies and allow a fair margin, but, with the usual exceptions for large buyers. There are still many manufacturers allowing only 10 or 15 percent discount.

"Compensator and transformer oil is sold by some manufacturers at the same price to everybody. One of our members lost considerable business from a large concern because he would not sell them 5 gal. of compensator oil without a profit. What are the manufacturers thinking of who establish selling practices of this sort? It is certainly time for the motor dealers and specialists throughout the country to come together. It is only by organization that they will ever get anywhere, and the committee urges all motor dealers to join the motor section of the electra-



gists, for here is the most active organization of motor dealers in the country."

There are too many dealers with motor contracts. Let the manufacturer increase his discounts and appoint only those dealers who are active and earn it. Then a motor agreement will be worth while and we will all be on our toes in order to hold it. If a motor dealer starts cutting prices, then the manufacturer can take his agency from him. Under such an arrangement the manufacturers will receive the support of the motor dealers all over the country.

In some localities at the present time certain manufacturers have developed agencies in such numbers that other manufacturers cannot get adequate dealer representation in those localities; with the result that competition between manufacturers squeezes the dealers out and shoots published price schedules to pieces.

Competency to serve the motor manufacturers at the highest efficiency and the extension of the motor market at the most consistent pace is dependent upon the effort put forth by the dealer. His interest in the development of the market is essential. No less essential is the careful selection of the motor outlet by the manufacturer. In both cases there rests upon the manufacturers a responsibility which cannot be ignored. If the market is to be stabilized and the proper energy devoted to the extension of the market.

Unless there exists the incentive of a reasonable profit to excite this interest, and to stimulate this effort, the impotence which a demoralized market condition inevitably sets up will react, as it has been reacting to the detriment of the motor manufacturers' interests.

#### Method of Cure

It is only consistent with good faith in presenting an analysis of injurious and unhealthy conditions, to seek and propose a sound and well considered method of cure. There are many problems of individual technique, management, salesmanship, and internal policy, contributory to an improved market development, which the motor section plans to undertake for the good of its own members. These problems are being intelligently studied in section meetings.

But the external relations of the motor dealers with their suppliers pre-

#### RECOMMENDATIONS

- 1—Scientific elimination of unsatisfactory dealer outlets by means of rigid requirements as to: Character of dealer, credit responsibility, capacity to sell, install, and service.
- 2—Elimination of discounts to users.
- 3—Building up dealers' capacity to serve by: Sales helps; protection of contract holders; co-operation with dealers.
- 4—Penalties for infraction of contracts, including withdrawal of contracts where necessary.

sent the most serious problem. This problem can be met only by a conscientious and sincere inquiry, not only by the motor section, but also by the manufacture of the equipment of which they are the outlet.

There devolves upon the manufacturers the necessity for immediate action in respect to several factors determining the future stability of the market.

This report includes little that is new, regarding either the status of the business or the remedies proposed. With each week's elapse, the members of the motor section take a more definite and concurrent stand on the issues presented herein. Issues voiced to the manufacturers as fundamental well over a year ago, and pointed out as deserving their best attention. At St. Louis last summer, and at Riverside in October, the very same fundamentals were stressed, and remedies sought. Some slight correction of the continued situation has been noted. But the relief has come very slowly, much too slowly to be a flattering commentary on the executive ability of such firms as are here represented. National policies cannot be laid down by territorial branch managements. The national committee of the motor section of the electragists is our contact for the discussion of such. The California motor section expresses itself unequivocally as being dissatisfied with the attitude of "buck passing" and temporizing, or at best with the lethargy of the California manufacturers' representatives as a whole, through the past year. Faulty and imperfect as the national policies may be as published, a very much healthier condition might well exist under a straightforward local application of those policies by manage-

ments definitely attempting a better dealer condition, rather than side-stepping the burdens and difficulties involved, and in many cases still persisting in those business grabbing practices which ruin dealer morale and again retard the satisfactory condition awaited by the industry. The motor section is presenting issues it presented a year ago; something has been started but very little accomplished. The longer the real issues are side-stepped, the longer will this motor business slump along far below its potential level.

The motor section of the California Electragists, therefore, submits to the manufacturers of motors and motor equipment, the following recommendations for distinct improvement of policy and subsequent improvement of the market which the renewed efforts of motor dealers will bring.

Motor manufacturers can benefit themselves materially, even as they will benefit their dealers, by the following:

#### Recommendations

1st—Scientific elimination of unsatisfactory dealer outlets gradually and over a sufficient period of time so as not to cause hardship, by means of more rigid requirements as to:

- (a) Character of dealer outlet.
- (b) Credit responsibility.
- (c) Capacity to sell, install and service.

2nd—Elimination of discounts to users.

3rd—Building up their dealers' capacity to serve and enlarge the market by means of:

- (a) Sales training and helps.
- (b) Protection of contract holders and
- (c) Cooperation with dealer outlets.

4th—Penalties for infraction of contract, consisting of unethical and unauthorized practices on the part of contract holders, even to the extent of withdrawal of contract privileges for those not living up to contract requirements.

The motor section is confident that the manufacturers will realize the situation and the recommendations resulting from this analysis are offered for the express purpose of improving a market in which both manufacturers and dealers are interested and affected.

The motor dealers make certain recommendations it is true, but in making them they accept certain responsibilities no less rigorous.

# Chats on the National Electrical Code

*A Monthly Discussion of Wiring Practice and Questions of Interpretation,  
Presented with a View Toward Encouraging a Better Understanding of the In-  
dustry's Most Important Set of Rules*

Conducted by F. N. M. SQUIRES  
Assistant Chief Inspector, N. Y. Board of Fire Underwriters

## Approved Materials

There seems to be considerable misunderstanding among both contractors and inspectors, and especially supply dealers, as to what materials and appliances are "approved" for use in the electrical field. I shall not attempt to define "approved" but to merely state its popular meaning.

Approved material is such that it meets the standards adopted by some organization having facilities for proper testing in order to ascertain the suitability of the material for the use to which it is subjected.

In the electrical field, Underwriters' Laboratories is the best known authority and its approvals are accepted quite generally throughout this country. There are, of course, other laboratories or bodies whose tests are accepted.

But how is one to know whether or not a particular item is approved? In some cases labels are affixed which give visible evidence which is readily identified in the field, but in many cases, the material is not marked in any way. Resource must, then, be had to the published lists of these organizations.

"List of Approved Fittings of the Underwriters' Laboratories itemizes not only labeled goods but also those which are approved by the "Re-examination Service" of these Laboratories. The only way which the man in the field, whether he be contractor or inspector, can know of this is by reference to these published lists. As each article appears in the list, it is stated whether it will bear a label or is approved through re-examination service.

Inspectors should, therefore, have with them at all times these lists and each contractor's office should have them in the files.

In order to emphasize these facts to our readers, we will enumerate some of the materials, fittings or appliances which fall under the two classes of approval. These, of course, are taken

from the list of the Underwriters' Laboratories.

Labels are required on:

Armored Cables and Cords  
Cabinet and Cutout Boxes  
Conduit (Rigid and Flexible)  
Enclosed Branch Circuit Cutouts (Assembled for panels)  
Fixtures and Fittings—some. (Others have re-examination service)  
Fuses, Cartridge  
Lightning Rods and Fittings  
Musical Instruments (Action for pipe organs, phonograph and phonograph-radio receiver.)  
Non-metallic Sheathed Cable  
Panel Boards  
Picture Machines (For use in fire-proof booth—some) (For use without booth) (Portable—some)  
Raceways for Surface Wiring  
Radio Appliances—some  
Signs—Electric  
Switches  
Enclosed (service, Class AA and A-B)  
Snap (Die. Labels p. 254)  
Door  
Fixture  
Pendant  
Surface  
Tubing, Flexible  
Wires  
Rubber Covered  
Flexible Cord  
V. C.

Re-examination Service. (No Labels.)

Connectors for Armored Cable  
Attachment Plugs  
Auto Transformer Starters  
Cabinets and Cutout Boxes of Inside Use and Weatherproof types. (Sheet metal requires labels.)  
Christmas Tree Lighting Outfits  
Circuit Breakers  
Cleaning Machines  
Conduit Fittings and Fibre Conduit (not conduit, which must have labels)  
Current Taps  
Cutout Bases  
Cartridge  
Plug (except Panels)  
Electric Lighting Plants  
Elevator Appliances  
Fixtures and Fittings—some (Some have labels)  
Fuses  
Plug  
Special  
Ground Clamps  
Hangers, Lamp and Fixture  
Heaters, Electric  
Flat Irons and Machines  
Insulating Devices and Materials  
Lamps and Lamp Fittings  
Lightning Arresters

Motors for Use in Explosive Atmosphere  
Office Appliances  
Outlet Boxes, Plates and Fittings  
Picture Machines (some)  
Stereopticon  
Appliances  
Radio Appliances (some)  
Receptacles  
Attachment Plug  
Stage Type  
Lamp Receptacles  
Rectifiers  
Refrigerating Appliances  
Resistance Appliances  
Rosettes  
Scales  
Signal Appliances  
Bells, Buzzers and Horns  
Systems  
Sign Flashers (Must be installed in approved box or cabinet)  
Sockets  
Switches  
Automatic—Clock  
Float  
Machine  
Magnetic  
Pressure  
Oil Break  
Snap, Combination Cutout  
Special Mechanism, Fixture  
Flush—(some)  
Special Mechanism, Pend. socket surface  
Miscellaneous  
Temperature Regulating Appliances  
Time Recording Appliances  
Toys  
Transformers  
Bell Ringing  
Power  
Welding Machines  
Wires  
Asbestos Covered  
Flameproof  
Fixture, Asbestos } only  
Slow Burning }  
Flexible Cord—Asbestos only  
(Heater Cord has Label Service)  
Slow Burning  
Weatherproof  
Miscellaneous  
Wire Connectors  
X-Ray Apparatus  
Miscellaneous

## A Tip About Fixtures

Advice is given at this time to those interested in the electric lighting fixture business that now will be a very good time to start "cleaning house." While the Laboratories list about thirty manufacturers as making approved fixtures, there are thousands of fixtures being turned out every day for which no pre-



tense is made that they are or could be "approved."

The fixture game has been considered a hard one to regulate properly as many fixtures are made up in various shops or on the job itself and the question has been, "where would the labeling be done so that the inspector would know that the fixture was approved." That part of the program can be worked out, in fact, it must and will be as the inspection authorities are chafing under the present conditions.

Fixtures have been going from bad to worse and are in many cases now being made of sub-standard materials and put together very haphazardly. Many of the better class of fixture houses are disgusted with the products on the market today and are anxious for conditions to become better.

Underwriters' Laboratories have been busy for some time now formulating standards and specifications under which fixtures will be approved. As soon as these have been adopted, the inspection authorities will insist upon "approved" or labeled fixtures.

This warning is given, therefore, at this time so that those now having more or less of the standardized material on hand will not find themselves in a "jam" later.

A word to the wiser ones should be sufficient.

#### Covers For Outlet Boxes

Covers for outlet boxes seem to be a matter of small importance and yet considerable difficulty has been experienced with them.

Attention is called to Rule 801-J in which "metal covers of outlet boxes shall be of thickness equal to that of the wall of the box" and Rule 701-E which requires that outlet boxes shall be of not less than No. 14 U. S. sheet metal gauge. Therefore the covers should be of not less than No. 14 gauge metal.

There are in the supply houses covers of as thin as No. 22 gauge. These should, of course, be rejected in all cases by both contractors and inspectors.

When we come to switch or receptacle boxes, a little confusion has been caused by attempting to apply rule 701-E to box covers. This rule is that flush switch and receptacle boxes shall be not less than .04 in. in thickness.

The way to decide which weight of metal to use is simple if we consider how the cover is used.

If the cover is attached to the box and the switch or receptacle is attached to the cover the No. 14 metal should be used as the strains impressed on the device must be borne by the cover. If, however, the switch or receptacle is attached to the box itself independent of the cover and then the cover supported on the switch or receptacle the cover becomes a plate and the .04 in. metal may be used.

#### Threadless Fittings

Our inspectors report that paint on the conduit is not being removed where threadless fittings are used. This is a violation of the Code. To correct it after the job has been installed will entail a lot of extra work. Contractors are requested to instruct their wiremen to be more careful and scrape off all paint or enamel where the conduit enters threadless fittings. Of course this extra work is not necessary if zinc coated conduit is used.

—GEO. WELLMAN.

#### Inaccessible Location for Cabinets and Cut Out Boxes

Rule 805 (c) 1925 Code, states that "cutouts shall be placed in readily accessible locations." We notice that some contractors install the branch circuit cabinet in the wall at a location where a china closet or pantry shelves are later erected by the builder. Shelves are sometimes placed directly over the door of the cabinet, but even if shelves do not interfere with opening the cabinet door, glassware and other material stored on the shelves render the cabinets inaccessible and violate the rules. Care should be taken to locate fuse cabinets in more suitable locations. One builder told us that he located the cabinet in the back of a china closet so as to conceal it. This is no valid excuse, because cabinet trims may be furnished in any colors to match the walls, and may be installed in inconspicuous places.

Another inaccessible location is in the top of the wooden boxes furnished by the power company for outside service and meter enclosures. It is practically impossible to open the metal doors of the branch fuse cabinets as some contractors install them.

All places where the cabinet door does not open properly will be con-

sidered as a violation of rule 805 (c).

—GEO. WELLMAN.

#### Loose Receptacles

A receptacle plate for a duplex receptacle fastened to the receptacle by one screw in the center will not stay rigidly placed in position unless reasonable care is used in its installation. The code allows an outlet box to be placed not more than ¼ in. back of the plaster line. The switch or receptacle should be built out to the face of the plaster line by means of washers, under the lugs, provided for that purpose. Unless the switch or receptacle is so built out, it gets its support solely from the tension of the two fastening screws in the plate. This puts an undue strain on the screws and is liable to result in a loose fitting in a short time. For those duplex receptacles where the plate is fastened by means of one screw in the center, it is absolutely necessary that the receptacles be built out from the outlet box to the plaster line by the use of washers.

—V. H. TOUSLEY.

#### Another Maverick

Several subterfuges have been attempted to foist bootleg material upon the market of late. A very insidious one has just come to light.

An inspector reports that he has run across a coil of flexible armored cable made by a manufacturer of approved armored cable. This coil had no approval labels on, but there was attached the manufacturer's tag, the reverse side of which read:

"Manufactured according to Underwriters' specifications. Not responsible for it after it is installed. Therefore, recommend approval of your local inspector before installation.

..... Company."

Now what local inspector has the facilities for testing cable to ascertain that it meets with the standard specification? What local inspector has the authority to judge that the cable is so made? What local inspector will assume the responsibility of approving such cable?

Contractors must be very careful in using such cable as this as the manufacturer gives due warning that he is not responsible after it is installed. And we are sure that no inspector will be responsible.

# *The Electragist*

Official Journal of the  
Association of Electragists—International  
S. B. WILLIAMS  
Editor

## Code Revision Machine Breaks Down

The vehicle for revising the National Electrical Code has finally broken down and must be replaced by a new machine better adapted to keep pace with the progress of the electrical industry.

In the long time that it has been in service, it has worked faithfully; but of late years it has squeaked badly, until, finally, at the meeting last month it acknowledged its own inability to do the job.

Some new plan and new procedure must be found to produce the needed changes in the Code as required without all of the political agitation, the far too frequent meetings of large committees and the tremendous cost the industry has been put to. Our future Code revisions should make for Code clarity and for coordination between articles. Under the present setup of big committees, this has been increasingly difficult to accomplish.

The thanks of the industry should go to the men who have given their time to Electrical Committee work. It is not their fault that the machine has broken down. For all these years they have worked, as they have been appointed—as individuals. The job has become too big for that kind of a set-up.

There is no flexibility, no give and take, to the present Electrical Committee, each member is a Code maker. We need fewer Code makers and some body of review. We cannot afford to spend the time of industry executives to dot "i's" and cross "t's." The wording of sections can be done by professionals, paid for that purpose. The executives should be asked only to pass upon principles.

## Sportsmanship

A sportsman plays the game on the level, win or lose. The amateur plays for glory, the professional for money, but both are sportsmen.

Business is called a game played by professionals, but we sometimes think that the players are paying too much attention to the pay check and too little to the rules of good sportsmanship.

The cleaner the game the more enjoyable and profitable it is for participants as well as those who pay to get in. Only true sportsmen play a clean game.

The electrical industry has always pointed with pride to its men—we have felt that they averaged up a little better than the men of other industries. We have felt that the

electrical industry had a magnetic attraction for the better type of American manhood.

Association men stand for the highest ideals of fair play in sports. Why is it then that this cream of American manhood—the men of the electrical industry—forget the rules of sportsmanship so frequently when engaged in business?

We are an industry of central stations, manufacturers, jobbers, contractors and dealers. Can't we give each other an even break—we would do as much for a bird in the field. Can't we think a little bit more of the rules of fair play and less of the pay check? And if we do, isn't it true that business will be better and more profitable for all of us?

## Repudiated at Home

The introduction of steam heat and electricity into English county homes has been responsible for the epidemic of mansion fires in recent years according to a report in the *New York Times* on January 4. The discovery, it was stated, was made as a result of investigations by insurance companies into reports of incendiarism.

This is the type of electrical wiring that some of our central station friends would have us use in the United States, because of its cheapness. If it is too dangerous to use in homes of masonry construction, what would it be in the American frame house?

## Farm Wiring

Electric service lines are stretching out into the rural districts with surprising speed, opening up a new market for wiring—the farm. In the past there have been many mistakes in farm electrification and the one that the contractors have made is wiring too cheap.

Like everybody else the farmer is interested in saving money, but not to the point where service is going to be curtailed. The farmer wants the cheapest in the long run.

Some people seem to think that the farmer cannot be sold a first class, complete installation because of cost. The fact that it is being done and without any particular difficulty is proof that it can be done.

Give the farmer a good job—give him a job that will meet his peculiar requirements. The farm is not alone a home—it is an industrial plant as well. He may not use motors to start with, but he will before long. Therefore, take the future into consideration in laying out the wiring.



Make provision for spares and for excess capacity in the service and mains.

Study the needs of mechanical protection in out-buildings, study the conditions of dampness in certain of the buildings, remember the tendency of live stock to lick metal, give more than passing consideration to grounding, for in almost all cases the grounds must be driven.

In other words, don't take farm wiring for granted. Study the peculiarities of a farm and make the best kind of a layout you can. The farmer is going to be a large source of revenue to the contractor if the contractor does his work right.

### Defective Material

At times a contractor will pick up labeled material that is defective. This may come about as the result of any one of a number of causes mostly beyond the control of the manufacturer. The fact, however, that the material bears a label of approval does not make it right when it appears to be defective.

Don't try to install apparently defective material, label or no label. The inspector, if he is on the job, will surely condemn it and then there will come the extra expense of tearing out and installing other material.

### One Size Fuse Cutouts

Before long we should have the result of the work now being done on 15-amp. cutouts which will permit the use of 15-amp. fuses and no others. There has been a real need for such a cutout for many years but while many have worked on the problem there have been too many stumbling blocks. Such hindrances as were man-made have largely vanished and there is now every reason to expect progress.

However, when a practical solution of the problem has been found it is to be hoped that the patents are so held that all interested manufacturers be offered licenses under conditions that are not restrictive. Moreover, if more than one device reaches the market it is hoped that the interchangeability feature will be recognized.

We look forward to the day when bridged over fuses and fuses backed by pennies are gone.

### More and Better Buildings

What is it that is keeping new construction up to its present levels? For four years people have looked for the bottom to drop out of the building market and it hasn't. Why?

Some kinds of new construction have fallen off. In some sections of the country the building market as a whole has declined but for the country as a whole it has continued to grow and will, in the opinion of those best qualified to predict, be greater in 1928 than in 1927.

There is only one reason and that is modernization. People want to live and work in modern buildings.

In many suburbs of large cities we hear that the real estate market is shot to pieces—there are hundreds of homes five to twenty-five years old on the market and no takers. Yet in every one of those places new buildings are being built and sold. People want modern homes. There never was any real housing shortage such as was talked about shortly after the war—there was a shortage of modern buildings.

Every new modern building makes a few old buildings obsolete. People work better in offices that are in modern buildings. Manufacturing companies are building new buildings because modern buildings have a habit of paying for themselves in the added production. The race for supremacy in manufacturing has doomed the old inefficient factory building.

This trend towards modern buildings will bring the modernization of those buildings which are sound and well located. The trend has already set in.

Therefore, there can be no decided slump in the building market. The pre-war levels are behind us never to return. We are working on a new level and a long, long way from approaching saturation.

### Kitchen Harmony

Red handled skillets, blue trimmed coffee pots—color in the kitchen is the new order of things. The women like it.

And so we find kitchen lighting equipment coming on the market enameled in blue, red, green, etc. It is a good merchandising idea.

It may sound a little silly to talk of kitchen harmony, harmonize the lighting fixtures with the pots and pans. When the new colored kitchen ware first came out the men folks thought it was a great joke. Well let's hope the bright colored lighting ware is as successful a joke.

We predict a big market for this kind of lighting equipment.

### Results

Reports are in from a number of cities that engaged in rewiring or refixturing campaigns towards the close of 1927. If judged in amount of money expended, they were all failures. But then that was a foregone conclusion. An advertising campaign of a month is not going to bring back much bacon.

On the other hand, wherever such campaigns were attempted the local trade relations were greatly improved. And that was worth while—worth all the money spent and more.

These campaigns teach certain lessons. They show, for instance, that additional wiring and lighting can be sold, that men in the industry can get together, that short campaign results are too expensive to warrant expenditures, that the training of salesmen cannot be too careful, that a standard fixture is not what the public wants.

These preliminary campaigns have been a good thing. Their lessons will save the industry thousands of dollars.

## Association of Electragists INTERNATIONAL

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Ernest Freeman.....1912-1914  
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STATE AND CITY	LOCAL SECRETARY	STREET ADDRESS	STATE AND CITY	LOCAL SECRETARY	STREET ADDRESS
<b>ALABAMA</b>			<b>NEBRASKA</b>		
Birmingham (C) .....	J. R. Wilcox	2017 First Avenue	Lincoln (L) .....	George Ludden	1329 N Street
<b>ARKANSAS</b>			Omaha (C) .....	E. H. Brown	1818 1/2 Harney Street
Fort Smith (C) .....	Edward Ryan	Ft. Smith Lt. & Trac. Co.	<b>NEW JERSEY</b>		
<b>CALIFORNIA</b>			Elizabeth (L) .....	A. G. Otis	Broad Street
Fresno (C) .....	Clyde L. Smith	1162 Broadway	Jersey City (C) .....	John Nairn	38 Oakland Ave.
Glendale (C) .....	W. L. Hyde,	154 S. Brand Blvd.	Long Branch (C) .....		
Long Beach (L) .....	V. Ringle	So. Cal. Edison Co.	(Asbury Park and		
Los Angeles (C) .....	Helen I. Mikesell	Chamber of Com. Bldg.	Red Bank)		
Oakland (C) .....	Laurence R. Chilcote	Robert & Webster Sts.	Newark (C) .....	Austin Hurley	Campbell Ave., Long
Pasadena (C) .....	H. W. Barnes	1331 N. Lake Ave.	Paterson (L) .....	Paul H. Jaehning	Branch
Sacramento .....	L. W. Sherman	910 Ninth St.	Philadelphia (Sec Lehigh	George Pape	435 Orange Street
San Francisco (C) .....	E. E. Browne	522 Call Building	Valley, Pa.) .....		43 Fair St.
Santa Ana (C) .....	O. N. Robertson	303 N. Main St.	Union City (C) .....	Frank Zeller	328 48th Street
Sureka (C) .....	J. H. Hilfiker	1717 H Street	<b>NEW YORK</b>		
<b>COLORADO</b>			Buffalo (L) .....	Samuel S. Vineberg	307 Electric Bldg.
Colorado Springs (C)...	Matt Whitney	208 N. Tejon St.	Brooklyn (C) .....	H. F. Walcott	60 Third Avenue
Denver (C) .....	E. C. Headrick	89 Broadway	Jamestown (C) .....	Henry M. Lund	309 Main Street
Pueblo (C) .....	E. F. Stone	So. Colorado Power Co.	Nassau-Suffolk (C) ....	Henry T. Hobby	55 Front Street, Rock-
<b>CONNECTICUT</b>					ville Centre, L. I.
Hartford (C) .....	A. A. Angello	473 Park St.	New York City		
Waterbury (C) .....	D. B. Neth	107 West Main St.	Section No. 1 (C) ....	Walter Knapp	207 East 43rd Street
Bridgeport (C) .....	L. E. Finch	529 Newheld Bldg.	Independent (C) .....	Nathan Zolinsky	2286 Seventh Ave.
<b>DIST. OF COLUMBIA</b>			Metropolitan (C) .....	George W. Neil	96 Beekman St.
Washington (L) .....	Norman H. Barnes	Potomac Elec. Power Co.	Niagara Falls (C) .....	E. M. King	515 Niagara Street
<b>FLORIDA</b>			Rochester (C) .....	Theo. T. Benz	278 State Street
Bradentown (C) .....	W. S. Stewart	W. & S. Elec. Co.	Schenectady (C) .....	Richard Spengler	421 McClellan Street
Daytona Beach (C) ....	C. Leotah Benson	344 1/2 S. Beach St.	Syracuse (C) .....	Fred P. Edinger	802 East Water St.
Deland (C) .....	C. W. Allcorn	132 No. Florida St.	Utica (C) .....	W. C. Balda	228 Genesee Street
Fort Myers (C) .....	P. K. Weatherly	Thompson-Weatherly Co.	Westchester Co. (C)....	Jack Lalley	14 Mnr. Hse. Sq., Yonkers
Indian Riv. Dist. (C)...	I. A. Paige	Vero Beach	Yonkers (C) .....	Louis Mayer	485 South Broadway
Jacksonville (C) .....	W. A. Harper	108 W. Bay St.	<b>OHIO</b>		
Miami (C) .....	E. A. Robinson	118 N. W. First Ave.	Akron (C) .....	E. C. Rishel	540 East Avenue
Orlando (C) .....	Solon M. Lantz	833 E. Concord	Canton (C) .....	H. S. Hastings	301 New Vickery Bldg.
St. Petersburg (C) .....	Gardiner Blackman	P. O. Box 992	Cincinnati (C) .....	J. F. Riehle	1642 Cedar Ave.
Tampa (C) .....	P. F. Lyons	73 Walton St.	Cleveland (C) .....	F. T. Manahan	Chester Twelfth Bldg.
<b>GEORGIA</b>			Columbus (L) .....	O. A. Robins	1242 Oak Street
Atlanta (C) .....	B. K. Laney	Byck Electric Co.	Lorain (C) .....	A. B. Walton	3150 E. Erie Ave.
Savannah (L) .....	Sylvan M. Byck		Toledo (C) .....	Fred C. Dunn	Builders' Exchange
<b>ILLINOIS</b>			Dayton (C) .....	Clarence Carey	1107 South Brown St.
Chicago			Massillon (C) .....	F. D. Mossop	c-o Mesco Electric Co.
Electrical Contractors'			Northern Ohio (C) ....	R. A. Wentz	Elyria
Association			<b>OKLAHOMA</b>		
Master Elec. Contrac-			Pawhuska	C. G. Sego	Pawhuska
tors' Association			<b>OREGON</b>		
Decatur (C) .....	J. W. Collins	230 No. LaSalle St.	Portland (C) .....	J. R. Tomlinson	51 Union Ave. N.
Granite City (C) .....	F. J. Boyle	304 S. Halsted St.	<b>PENNSYLVANIA</b>		
Peoria (C) .....	Earl Weatherford	114 East William St.	Altoona (C) .....	Walter Bracken	Leechburg
Rockford (C) .....	Paul S. Pender	1916 Edison Ave.	Allegheny Valley .....	E. G. Jackson	12 West Third Street
Springfield (C) .....	L. B. Van Nuys	238 So. Jefferson Ave.	Du Bois (C) .....	C. E. Blakeslee	12 E. Long Av.
Wheaton (C) .....	Donald Johnson	106 North Second St.	Easton (L) .....	H. Clark Kreider	Arcade Bldg., Center Sq.
<b>INDIANA</b>	A. D. Birnbaum	916 West Cook St.	Erie (C) .....	R. D. Goff	11th and French Sts.
Lake County (C) .....	E. C. Krage	135 West Front St.	Lehigh Valley (C) ....	A. W. Hill	Bethlehem
Indianapolis (L) .....	A. R. Irwin	3461 Mich'n Av., Ind. Har.	Philadelphia (C) .....	M. G. Sellers	1202 Locust Street
Michigan City (C) .....	A. W. Kruge	2405 E. Tenth St.	Pittsburgh (C) .....	D. A. Fleming	518 Empire Bldg.
Muncie (C) .....	Walter A. Sassodeck	913 Franklin St.	Wilkes-Barre (L) .....	Leon N. Sell	Town Hall
South Bend (C) .....	Harry McCullough	113 W. Howard St.	<b>RHODE ISLAND</b>		
<b>IOWA</b>	R. A. Frink	1338 Howard St.	Providence (C) .....	H. E. Batman	36 Exchange Place
Cedar Rapids (C) .....	H. E. Neff	94 First Ave., West	<b>SOUTH CAROLINA</b>		
Davenport (C) .....	Louis F. Cory	510 Brady St.	Charleston (L) .....	J. P. Connolly	141 Meeting Street
Des Moines (C) .....	Floyd J. Moeckly	521 Hubbell Bldg.	<b>SOUTH DAKOTA</b>		
Fort Dodge (C) .....	J. A. Paul	16 So. Twelfth St.	Sioux Falls .....	H. W. Claus	326 S. Phillips Ave.
Sioux City (C) .....	E. A. Arzt	211 Fifth St.	<b>TENNESSEE</b>		
Waterloo (C) .....	R. A. Cole	Cole Bros. Elec. Co.	Chattanooga (L) .....	P. W. Curtis	725 Walnut Street
<b>KANSAS</b>			Knoxville (L) .....	Jerry G. Cason	303 West Church St.
Salina (C) .....	C. G. Loomis	814 Cedar St.	Memphis (L) .....	J. J. Brennan	12-16 So. Second St.
Wichita (C) .....	P. W. Agrelius	Wichita	Nashville (C) .....	J. T. Shannon	c-o Electric Equip. Co.
<b>KENTUCKY</b>			<b>TEXAS</b>		
Lexington (C) .....	J. H. Brock	235 East Main St.	Beaumont (C) .....	J. A. Solleder	Houston & Bolivar Sts.
Louisville (C) .....	C. L. W. Daubert	921 South Third St.	Dallas (C) .....	P. B. Seastrunk	2032 Commerce St.
Paducah (L) .....	K. H. Knapp	c/o Paducah Electric Co.	Houston (C) .....	J. W. Read	715 Capitol Avenue
<b>LOUISIANA</b>			<b>UTAH</b>		
New Orleans (C) .....	I. G. Marks	323 Chartres St.	Ogden .....	B. Kristofferson	2249 Washington Ave.
Shreveport (C) .....	R. L. Norton	620 Marshall St.	Salt Lake City (C) ....	C. Louis Collins	215 Kearns Bldg.
<b>MARYLAND</b>			<b>VIRGINIA</b>		
Baltimore (C) .....	A. P. Peterson	515 Cathedral St.	Lynchburg (C) .....	J. L. Fennell	c-o Fennell & App
<b>MASSACHUSETTS</b>			Norfolk (L) .....	A. W. Cornick	200 Plum St.
Boston (L) .....	Edward G. Jay	164 Federal St.	Richmond (C) .....	E. M. Andrews	15 N. Twelfth Street
Lowell (C) .....	George A. Ryan	79 Middle St.	<b>WASHINGTON</b>		
Haverhill (C) .....	H. W. Porter	14 West St.	Seattle (L) .....	P. L. Hoadley	Seaboard Building
Malden (Medford, Ever-	H. J. Walton	c/o Malden Electric Co.	Spokane (C) .....	William Stack	W. 1121 Cleveland St.
ett and Melrose) (C)...	C. S. Foster	220 Dwight St.	<b>WEST VIRGINIA</b>		
Springfield (C) .....	John W. Coghlin	259 Main St.	Wheeling .....	Peter J. Erb	1414 Eoff St.
Worcester (L) .....			<b>WISCONSIN</b>		
<b>MICHIGAN</b>			Green Bay (C) .....	V. E. Grebel	531 S. Broadway
Detroit (C) .....	N. J. Biddle	112 Madison Ave.	Madison (C) .....	Carl J. Marsh	710 Beaver Bldg.
Grand Rapids (C) .....	T. J. Haven	1118 Wealthy St., S. E.	Milwaukee (C) .....	E. H. Herzberg	1604 Wells Street
Kalamazoo .....	E. R. Hummel	1121 Seminary St.	Racine (C) .....	Joseph J. Small	1910 Linden Ave.
Saginaw (C) .....	E. T. Eastman	209 Brewers Arcade	<b>CANADA</b>		
<b>MINNESOTA</b>			Montreal (C) .....	George C. L. Brassart	674 Girouard Ave.
Duluth (L) .....	Morris Braden	c-o Minn. Pow'r & Lt. Co.	Toronto (C) .....	J. A. McKay	302 Excelsior Life Bldg.
Minneapolis (C) .....	W. I. Gray	209 Globe Building	Vancouver (C) .....	J. C. Reston	579 Howe St.
<b>MISSOURI</b>			Winnipeg (C) .....	Fred Ball	300 Princess St.
Kansas City (C) .....	Walter C. DeBold	City Bank Bldg.			
St. Louis					
Electragists' Ass'n (C)	W. F. Gerstner	120 No. Second St.			
Electric Employers'		Wainwright Bldg.			
Association (C) .....	G. L. Gamp				

(C) designates exclusively Contractor-Dealer organization.

(L) designates an Electrical League.

# FEBRUARY ACTIVITIES

## Florida Electragists Have Annual Convention

Speeches by Electrical Industry Leaders Feature Meeting

**A**DDRESSES by leaders of the electrical industry kept the members of the Florida Association of Electragists interested and busy for three full days, February 23, 24 and 25, when the annual convention was held at Orlando.

Among the speakers were: Laurence W. Davis, general manager of the Association of Electragists, International; David Reed, president of the Association of Municipal Electricians; D. J. Morgan, sales engineer, Hazzard Manufacturing Company; H. B. Kirkland, Society for Electrical Development; L. A. S. Wood, Westinghouse Electric

and Manufacturing Company; J. P. Williams, Lumbermen's Association, who talked on the Lien Law; and J. W. McGill, president of the Commercial Bank of Orlando, who spoke on the subject of Credits:

Officers elected at the annual meeting were:

President W. S. Monroe; Vice President, M. A. Ladd; Secretary-Treasurer, Charles E. James; Executive Committeemen, George H. Vandeusen and T. A. Brown.

Part of the program was broadcast from Orlando.

tions of inspectors were present at the conference: K. W. Adkins, W. S. Boyd, W. P. Briggs, W. J. Canada, C. S. Cahaskie, A. P. Denton, J. C. Forsyth, M. B. Gleeson, A. R. Hall, J. W. Kelly, W. J. Mahan, J. S. Mahan, R. M. Nesbitt, C. W. Mitchell, A. R. Small, E. P. Slack, R. B. Shepard, V. H. Tousley, G. W. Wellman, and R. Walker.

## Building Construction Increased

Total construction contracts awarded in January in 37 states east of the Rocky Mountains amounted to \$427,168,700, which was an increase of 11 per cent over January, 1927, according to Dodge reports. This was next to the largest January total on record. Contemplated construction projects reported amounted to \$307,137,500, an increase of 81 per cent over January last year, and of 30 per cent over December, 1927. The figures show that 45 per cent of all construction contracts were for residential buildings; 17 per cent for public works; 16 per cent for commercial buildings; 9 per cent for industrial buildings; 5 per cent for educational buildings; 3 per cent for hospitals and institutions; 2 per cent for social and recreational projects, and 1 per cent each for public buildings and religious and memorial buildings.

## Formation of International Association of Inspectors Considered

Electrical Field Secretary May be Inspector Secretary

**P**LANs for the formation of the International Association of Electrical Inspectors and a tentative constitution were prepared at meetings of the organization committee in New York February 13 and 17, 1928. The set-up of the organization will be very similar to that of the Association of Electragists, International, upon which it is patterned. There will be a number of sections, approximately six, geographically arranged so that members can easily attend sectional meetings. Each section will have one or more representatives on the national council, depending upon the number of active members.

The proposal was made that the field secretary of the N. F. P. A. also hold the position as field secretary of the International Association of Inspectors, and this is now under consideration by leaders of each group.

Under the proposed by-laws there are three classes of members, active (including electrical inspectors) associate (including anyone interested in the association who is not an inspector), and cooperating (including persons and organizations wanting to support the as-

sociation with money). Utility members are prohibited from membership on the executive council and are not permitted to vote for members of the council.

The objects of the newly organized association are as follows: "To cooperate in the formulation of standards for the safe installation and use of electrical materials, devices and appliances. To promote the uniform understanding and application of the National Electrical Code. To secure and promote uniform administrative ordinances and inspection methods. To collect and disseminate information relative to the safe use of electricity. To represent the electrical inspectors in all matters which are dealt with nationally. To cooperate with other national and international organizations in furthering the development of the electrical industry. To promote closer cooperation between inspectors, inspection departments, the electrical industry, and the public."

The first meeting of the executive council is to be held October 1, 1928; when the International organization will become effective. The following representatives of various section organiza-

## Strike to Close Open Shop Illegal

The Common Pleas Court, Cuyahoga County, Ohio, in December decided that a strike in a closed shop to compel the employer to close an open shop in another state is illegal. The decision was handed down in the case of The Bellows Corporation v. The Electrical Workers' Union, Local No. 38. The Bellows Corporation had been engaged in the manufacture, sale and erection of electric signs in Detroit for some time on an open shop basis. Recently the company opened a shop in Cleveland where it employed only members of the local union upon terms agreed to by a business agent of the union.



A few days later the union leaders requested the company to adopt the closed shop basis in Detroit, also, and threatened to start a strike in Cleveland unless this was done. The shop asked for an injunction. When the case came to trial it was decided by the court that the union could not call a strike in such a situation, as it would be in restraint of trade and contrary to the anti-trust laws of Ohio.

### Color Floodlighting

A method of floodlighting buildings with colored lights has been developed and put in operation by the Pittsburgh Reflector Company, the first installation being on the Edison Building in Philadelphia. After a series of tests, the "washlighting" method of floodlighting with changing colors proved to be the most effective and this method is used in the completed job, which was turned on December 31, 1927. In the job are 483 floodlights of 500 and 1000 watt capacities. The architect of the building was John T. Windrim; the electrical work was done by J. F. Buchanan Company; color caps furnished by the Laco-Phillips Company; and the dimmer by the Ward Leonard Company.

### Electrical Market Dwindling

Electrical manufacturers are finding their market dwindling because the public is buying chewing gum, automobiles, and musical instruments instead of electric service, said H. T. Bussman at the semi-annual meeting of the National Electrical Manufacturers Association in New York January 24.

The answer to the problem is a program of industry advertising and selling, now being studied by the Industry Sales Conference. "We must show the American public a complete electrical picture," said Mr. Bussman. "We must make the American public conscious that it is passing up a tremendous amount of pleasure and an opportunity for time-saving by ignoring the many features of electrical service.

"If we start a wiring campaign without building up the contractor group, we will not alter or benefit the economic aspect at all. We must work for a permanent bettering of the industry, and in building up the contractor we will have a sales organization to whom we need not pay one nickel of commission!"

## Safety First Campaign

UNDER the stimulus of A. R. Copeley, city electrician of Elgin, Ill., an electrical safety first campaign is being conducted by members of the electrical industry. The poster shown is being displayed by cooperating con-

hazardous appliances, devices and material. With the help and cooperation of each and every contractor, dealer and electrician, much can be done for the welfare of our city, both to life and property. It will take only a few

### MEMBER

## Safety First in Electricity

### Electrical Appliances and Devices

As Approved By  
National Underwriters' Laboratories  
For Sale Here

Information Cheerfully Given on Everything Electrical for Safety

tractors in their windows and shops and Mr. Copeley is urging safety in his monthly bulletins, one of which reads:

"This department desires to promote and move forward in the purchasing and use of everything electrical, on a safety basis. It is the duty of every electrical contractor and dealer, also electrician, to explain and instruct your customer, the public as a whole, the art in purchasing the correct appliance, device and material. Through the misfortune or the lack of knowing how to buy for resale, many dealers are selling

minutes of your time to explain the hazards which are involved by purchasing inferior appliances, devices and material. I am sure you will be rewarded for the good that can be done. It will surely show good fellowship and be the means of combating fire. As for example, tell them to look for the manufacturer's name, also the rating in voltage, amp. or voltage and wattage; also the art in purchasing good lamp cord, etc. You owe such explanations to your customer, your neighbor, your community."

### Northwest Inspectors Favor Code Changes

Members of the Northwest Association of Electrical Inspectors at their third annual convention in Seattle, January 28, passed a resolution favoring certain changes in the National Electrical Code, and endorsing in principle the proposed changes suggested by the Electrical Committee. The resolution stated that the Code is threatened with de-nationalization through varying local regulations covering wiring, load layout, diversity, wire sizes, motor and circuit protection, and other subjects and the in-

spectors felt that this was due to the absence of suitable treatment of these subjects in the National Electrical Code. It was suggested that the Code could be improved by further use of tables, which would accomplish greater clarity and insure more uniform interpretation.

Another resolution commended W. J. Canada for his work as Electrical Field Secretary of the N. F. P. A., and the association favored the filling of the vacancy created by his resignation as soon as possible "by a fair minded, broad gauged, well informed and fearless man, who can inspire the confidence of all branches of the industry."

## Niagara Contractors Developing Market

Louis Wipperman Discusses Status of House Wiring Contractor and Methods of Increasing His Business

A COMMITTEE of electrical contractors, headed by Louis Wipperman and including Hugo Vanelli, Ed. Burrows, Ray Haynes, Jos. Morton, N. B. Phillips, and J. J. Quigley has been appointed by the League of the Niagara Frontier to plan a wiring development program for 1928. The need for such a program was emphasized by Mr. Wipperman in his speech accepting chairmanship of the League's wiring committee. The electrical contractors must learn to work together, he said, and put over a real selling job, to fulfill the expectations of the rest of the electrical industry that the contractor is the logical point of contact with the consumer. Mr. Wipperman pointed out that the wiring of homes is done by a class of contractors 90 per cent of whom are not Electragists and are too busy doing their own work.

"I have had the pleasure of attending a meeting of the Red Seal Committee of the electrical industry sales conference recently and am gratified to learn, through THE ELECTRAGIST magazine that a thought expressed through this sales conference is that *some way must be found to make salesmen out of electrical contractors*. This should not be a difficult job if the industry will differentiate and realize that the house wiring contractor status is as previously expressed and that he possesses a greater knowledge of the building construction than any other building trade.

"He must have and he has a good knowledge of construction and general supplies.

"A knowledge of detailed plans of electrical construction.

"A knowledge of the National Board of Fire Underwriters and National Safety Codes.

"A knowledge of central station rules and municipal rules and requirements, and

"A knowledge of finance and accounting which is in evidence that the average electrical contractor is a student and is progressive.

"In addition to making salesmen of electrical contractors, the contractor should also be taught the method of

blending finance and accounting and recommend the assistance of manufacturers and jobbers association to perfect this blend."

### Court Favors City Wiring

The circuit court in Jacksonville, Fla., has ruled that electrical wiring by the city was legal and could be continued. The ruling came in a suit entered by Edward Hamler as a taxpayer seeking to restrain the city, which operates a municipal plant, from wiring houses for electricity. Mr. Hamler argued that the city was stepping outside of its province in doing wiring work, and argued that the work was being done at less than cost on the theory that the city would profit through the increased use of current. But the court overruled him.

### Testimonial Dinner for Frank L. Lucas

Frank L. Lucas, newly appointed chief electrical inspector of Toledo, Ohio, was tendered a testimonial dinner by local members of the electrical industry. Mr. Lucas has just retired as president of the Toledo Electrical League but will retain his interest in the league as treasurer during 1928.

### Banquet in Washington

The annual banquet of the Electric League of Washington was held on February 15, and proved to be very popular. Joseph T. Kirchner was chairman of the entertainment committee.

### Fixture Association Elects Officers

Officers of the Artistic Lighting Equipment Association elected at the annual convention in Cleveland January 25-27 included: President, George J. Klein, Novelty Lighting Corp.; Vice President, C. A. Bridges, of Moe-Bridges Company; Members of board of directors: M. D. Blitzer, Lightolier

Co.; Paul W. Jenkins, Macbeth-Evans Glass Co.; H. O. Stewart, Scott-Ullman Co.; Fred R. Farmer, Beardslee Chandelier Mfg. Co.; Wm. Horn, Horn & Branney; E. F. Guth, The Edwin F. Guth Co.; Herman Plaut, L. Plaut & Co.; B. F. Klein, The Kayline Co.; H. A. Framburg, H. A. Framburg & Co.; N. W. Belmuth, Shapiro & Aronson; Robert Biddle, Biddle-Gaumer Co.; Edw. N. Riddle, The Edw. N. Riddle Co.

The sales promotion plan of Granville P. Rogers, Managing Director, was approved, and the emblem tag of the association was accepted to read: "This tag indicates this merchandise was made by a member of the Artistic Lighting Equipment Association. Lighting equipment is the most prominent decoration in the home—choose wisely."

### House Wiring Campaign in Kingston

Members of the Hudson Valley Electrical League in Kingston, N. Y., are engaged in a house wiring campaign designed to reduce the number of unwired homes and produce new house wiring work for the contractors. A prospect list of owners of unwired houses was built up and three letters sent to all the names on the list. The first letter outlines the general advantages of electricity in the home, the second the convenience and small cost of electrical wiring, and the third states the reasons why the home should be wired at once. The last letter has an inquiry producing post card. Eight league contractors are going from home to home making a personal canvass of each of the prospects. Each member is given thirty prospect cards and he has to turn the cards back within two weeks, with notations of calls.

### Electrical Advertising Courses

The first electrical advertising courses will be given by the National Electric Light Association at Harrison, N. J., on March 5-8 and at Cleveland, Ohio, March 19-22, with the cooperation of the Edison Lamp Works of the General Electric Co., and the Westinghouse Lamp Company. The course will include such subjects as: The modern trend in electrical advertising; potential markets; special arguments and sales methods peculiar to this business,



together with engineering data on the design, application and maintenance of electrical advertising. Registration should be made through the sales divisions of the lamp companies.

### Electric Sign Show in New York

The sixth annual electric sign show was held in New York February 6 to 11, at which a number of the leading manufacturers of various types of electrical sign advertisements exhibited. In connection with the exhibition figures were prepared which show that there are now 20,880 electric signs in New York City, filled with 1,309,918 lamps. Broadway has the most signs, and Third Avenue is second. Signs are used in order of number by: Restaurants, barber shops, garages, tobacco stores, tailors, dentists and doctors, drug stores, theatres, banks, beauty parlors, fur stores, radio stores, loans, churches, photographers, undertakers, baths, and gymnasiums. There are 3,703 glass box signs, 181 sunken letter signs, 7,113 reflector signs, 515 roof signs, 155 tube signs, 2,998 special signs, 2,004 wall letter signs, and 4,211 raised block and glass lettered signs.

### Electragist Estimating Course at Syracuse

During the week beginning January 30 a class of contractors and estimators organized by the Electric League of Syracuse, N. Y. took up the study of estimating under the direction of Arthur L. Abbott, Technical Director of the Association of Electragists, International.

The complete A. E. I. standardized course of instruction was given, covering typical rigid conduit installations in both fire-proof and frame buildings, exposed conduit work for lighting, industrial plant installations, metal molding, armored cable work in apartments and small stores, and house wiring. Two sessions were held each day for five days, the class periods being from 4 to 6 P. M. and from 7:30 to 9:30 P. M.

The total registration for the course was twenty-eight and of this number twenty-five attended nearly every session. At the close of the final session a Contractors' Section of the League was organized including all the members of the class, with L. E. Barnett as

chairman. It is the purpose of the section to continue the study of estimating, to promote the use of the A. E. I. estimating system, to promote the use of adequate accounting methods by the members, and to engage in other ac-

tivities of like nature which will help to bring about better business conditions.

Jacob Heil is president of the league; Harvey N. Smith is secretary-manager and L. C. Scott is field secretary.

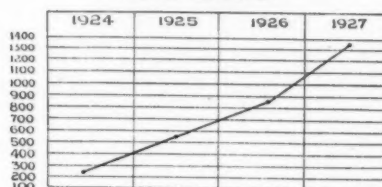
## Successful Local Development Program

### Toronto Sold a Half Million Dollars Worth of Electrical Business Under the Red Seal Plan

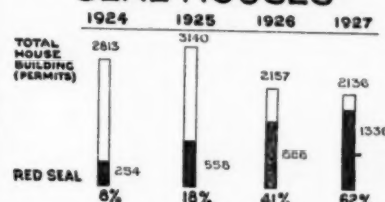
A LOCAL market development program which last year sold \$500,000 worth of extra electrical business at a sales cost of \$18,800, or 3.7 per cent, has been carried out by the Electric Service League of Toronto, Canada. The program added 40,000 outlets in Toronto houses and apartments, and increased the volume of wire, outlet, switch, fixture, lamp, and appliance sales, in addition to an increase of 2,000

in number of ranges installed. The manager of the league, in his annual report, stated: "The electrical industry has never had a cooperative market development plan that functions so well as the Red Seal plan when properly and vigorously operated. The whole electrical standard of installation has risen greatly on a permanent basis in Toronto by the work of the Electric Service League."

### GROWTH OF "RED SEAL" HOUSES



### PERCENTAGE OF RED SEAL HOUSES



### Average No. OUTLETS per Red Seal House

	1924	1925	1926	1927
No. of Red Seal Houses	254	558	806	1096
Average No. Outlets	38	45.5	53.4	59.20

### Division of Outlets 61 Houses Checked Dec. 1927

Ceiling	Brackets	Plugs	Switches	
893	612	701	1015	= 3211
AVERAGES PER HOUSE				
15	10	12	16	= 53

### 100% RED SEAL BUILDERS

1925	—	58
1926	—	210
1927	—	292

### Operating Field Work

	1925	1926	1927
Inspections	2197	3255	8188
Contacts	998	3024	5101
Builders, Contractors, etc.	3195	6279	13,289
Outlets counted in Red Seal Houses	25,051	42,838	64,890

### PERCENTAGE RED SEAL APARTMENT HOUSES

No. Built or Building	
1927	73
No. Red Seal	61
Percentage 83 1/2 %	

### RED SEAL Apartment Houses

To End	No.	Suites	Total Outlets	Average Per Suite
1926	26	566	11,830	20.9
1927	61	725	18,888	26.5
51 Checked				

### California Inspectors' Convention

Members of the California Association of Electrical Inspectors will hold their annual convention in Santa Barbara March 22, 23 and 24. C. W. Mitchell, secretary of the association, is actively engaged in promoting registration.

### North Carolina Plans Organization

Plans are under consideration for a North Carolina state organization of electrical contractors. W. P. Christian of Greensboro was named chairman, with Frank Davis and W. P. Brewer as committeemen to discuss details of the proposed plans. About 60 men attended the organization meeting which was held under the auspices of the Electrical Club of Greensboro.

### Lighting Sales Course

An evening lighting sales course is being held in Chicago by the Electric Association during February and March. Meetings are held every Monday night, and cover the following subjects: Fundamentals of selling, illumination, good lighting for the ordinary industrial; what to sell to laundry, machine shop, foundry, printing plant, wood-working plant, special applications; etc. Lectures are given by representatives of lamp and illumination device manufacturers.

### New Salt Lake City Ordinance

Outside contractors can not do business in Salt Lake City unless they have a place of business there, according to a clause which appears in the new city ordinance, passed by the city commission on December 29. The clause reads: "Permits for the installation of electric wiring, power, fixtures, appliances or apparatus shall be issued only to a licensed contracting electrician, having an established place of business in Salt Lake City, which shall be stated in the application for such permit."

Under the new ordinance additional zones are established where all wires must be in rigid metal conduit or approved metal moulding. In addition, conduit must be used in public or in-

dustrial buildings, such as churches, stores, halls, schools, garages, factories and warehouses, and in apartment houses more than one story high containing five or more apartments.

### Code Instruction School

Instruction in Code matters for electrical superintendents, foremen, and journeymen, under the auspices of the Los Angeles Association of Contractors and Dealers, began January 9. Weekly classes are held. Otto Wiemer, of the Los Angeles Inspection Department, is conducting the classes, which are designed to teach the men who do the wiring what they should know about the Code and how to make installations according to the Code in the most efficient and economical way.

### Officers Elected in Louisville

At the annual banquet of the Electric Club of Louisville, Ky., attended by 525 members, officers for 1928 were elected. The new president, Carl A. Klemm, succeeds Malcolm Mason; D. C. Wester was elected vice president; F. Sherman Vogt, secretary-treasurer; Truman Cooke, sergeant at arms, and Malcolm Mason, E. J. Theobald and Harold V. Bomar, Jr., directors.

### New Orleans Group Elects Officers

Electragists in New Orleans, La., who operate union shops, have organized a closed shop section which held an organization meeting on February 2. Robley S. Stearnes, of the Standard Electric Construction Co., was elected president, and I. G. Marks, secretary. The local electragists entertained H. B. Kirkland, of the Society for Electrical Development on February 16.

### Louisiana Electrical Exposition

A Louisiana Electrical Exposition will be held in New Orleans March 5 to 10, under the auspices of the New Orleans Electrical League. This is the first exhibition of this kind to be staged in the section. All branches of the industry are cooperating in the educational and business development program planned in connection with the exposition, of which W. E. Clement is

general chairman, with the following as members of the executive committee: Lyman C. Reed, H. B. Flowers, Frank G. Frost, M. J. Elgutter, Ben Willard, S. J. Stewart, and Leo Hirsch.

### Connecticut Valley Election

W. A. Parsons, Northampton, was elected president of the Connecticut Valley Electrical Dealers' Association at the monthly meeting in Springfield, Mass., to serve with the following additional officers: Ernest S. W. Bishop, of Preston & Bishop, Inc., Holyoke, Mass., vice president; William P. Collins, Springfield, treasurer; and E. L. Street-er, Greenfield, secretary.

### Los Angeles Association Moves

Activities of the Electrical Contractors and Dealers Association of Los Angeles have increased so greatly that the Association has been compelled to move to larger quarters in the Chamber of Commerce Building on West 12th Street. An office and committee meeting room will be maintained on the fifth floor and dining-meeting rooms on the ninth. The schedule of meetings each week follows:

Monday Evening—Code Class for Electricians.  
Monday Evening—Slide Rule Class—Estimators' Section.  
Tuesday Noon—Inspection Department Meeting.  
Tuesday Evening—Residence Wiring Section.  
Wednesday Evening—Motor Section (every two weeks.)  
Thursday Noon—Estimators' Section.  
Thursday Evening—New Ordinance Meetings.  
Thursday Evening—Membership Meeting (every 60 days.)

### Wisconsin Contractor Convention

Members of the Wisconsin State Association of Electrical Contractors and Dealers met in Milwaukee, Wis., February 1, 2, and 3, for their eleventh annual convention. The meeting was held in conjunction with the Master Builders Association of Wisconsin.

Among the speakers were: L. W. Burch, chairman, who made the keynote address; Otto Harloff, "Organizing Local Associations"; John J. Josephson, "State Association, Its Future"; Edward Herzberg, "The Round Table and the National Association."

District chairmen of the state association are: J. Josephson, L. W. Burch, J. L. Acker, J. E. Duer, and Wm. Meter.



### C. F. Crowley Promoted

C. F. Crowley, for several years Cleveland representative of the Hatfield Electric Company, contractors, has been elected vice president of the company. He will continue as Cleveland representative.

The Hatfield Company will be located after March 1 in the new Terminal Tower Building, Cleveland, in which they installed the electrical work.

## OBITUARIES

### Ellsworth P. Baker

Ellsworth P. Baker, of Pawtucket, R. I., one of the city's prominent business men, died at his home in Seekonk January 16 after a short illness. For over a quarter century he was engaged in business as an electrical contractor. Mr. Baker was born in Central Falls, R. I. He was a member of the Pawtucket Electrical Contractors' Association.

### J. F. Gerleman

J. F. Gerleman, vice president of the French-Gerleman Electric Co., St. Louis, Mo., died suddenly at his desk on January 27. Death was attributed to heart disease.

### Contractor Dealer Notes

Catlin's Inc., has opened a new and extremely modern electrical fixture store in Washington, D. C. The old electrical fixture house of Elmer H. Catlin Co. has been abandoned. In the new store the first floor is devoted to lighting units for hotels, apartment lobbies, banks, and other large buildings. The entire second floor is devoted to a display of residential lighting fixtures.

A difficult job of electrical engineering has just been completed by The Electric Contracting Co., of Wilmington, Del., in the wiring of the Diamond Ice & Coal Co. storage building. Very unusual circumstances made this a real wiring job. Other big jobs on the production schedule of this company are: Christ Our King Church, Marcus Hook High School; Ursuline Academy; Delaware State Armory; State College for Colored.

NePage McKenny Company, Seattle, has purchased a lot in that city and is planning the construction of a two-story shop and warehouse. The approximate cost of the plant will be around \$50,000.

Edward R. Bateman, Washington, D. C., recently chairman of the Red Seal committee of the local electrical league, has opened a new shop and appliance store. The main showroom occupies the first floor, with a balcony in the rear in which the offices are located, with the repair shop underneath. The lamp stockroom is out of sight just off the main floor.

Contracts for the installation of lighting and power systems in the new \$200,000 school in Fon du Lac, Wis-

consin, have been awarded to Kretsch Brothers, contractors, of Kiel, Wis. This concern also has a branch office in Chilton.

The Belle Glade Electrical Company, of Belle Glade, Fla., is erecting a new building for their installation and repair business. Later it is planned to add a department for installing and repairing radios.

The P. & V. Favreau Co., Lowell, Mass., has moved to a new store as a result of growth which made the old store inadequate. The Favreau company makes a specialty of wiring houses and in addition does a large appliance business, having sold more than 2,000 washing machines in the territory around Lowell.

## New Electragists

The following contractor-dealers have made application and been accepted into the A. E. I. since the publication of the last list in the February issue:

### CALIFORNIA

**Eagle Rock (Los Angeles):**

Eagle Rock Elec. Co.

**Corning:**

Wheeler & Greiner

**Exeter:**

Exeter Elec. Co.

**Glendale:**

G. A. Fjelstrom-Elect. Construction

**Kentfield, Marin:**

Tamalpais Elec. Co.

**Los Angeles:**

Progressive Elec. Works

**San Francisco:**

Atla Elec. Co.  
Coney & Kuchel Elec. Works  
Farnsworth Elect. Works

**Santa Rosa:**

H. W. Jacobs

**Stockton:**

Eddy Electric

### COLORADO

**Denver:**

Bolibaugh Elec. Co.

**Sterling:**

Logan Electric

### CONNECTICUT

**Hartford:**

Harry D. Hitchcock

### GEORGIA

**Atlanta:**

Dixie Elec. Co., Inc.

### ILLINOIS

**Chicago:**

Industrial Elec. Co.  
Marks Elec. Co.

### INDIANA

**Crown Point:**

Hills' Elec. Shops, Inc.

### MASSACHUSETTS

**Linwood:**

Guertin Bros.

### NEW HAMPSHIRE

**Hampton:**

Roland C. Emery

### NEW YORK

**Syracuse:**

Harrison L. Kloch

**Waterloo:**

Charles A. Lanphear

### OHIO

**Cleveland:**

The Berg-Clark Elec. Co.

**Dayton:**

O. W. Loney

**Findlay:**

Buckeye Elec. Co.

**Steubenville:**

Hocker Elec. Co.

**Upper Sandusky:**

H. Strasser & Son

### PENNSYLVANIA

**Philadelphia:**

Samuel A. Grass

### TENNESSEE

**Knoxville:**

Ideal Elec. Co.

### VIRGINIA

**Norfolk:**

Virginia-Carolina Elect. Wks., Inc.

### WASHINGTON

**Seattle:**

Olympic Elec. Co., Inc.  
Chas. E. Steele  
University Elec. Co., Inc.

### WISCONSIN

**Neenah:**

The Valley Constr. Co.

### CANADA

### BRITISH COLUMBIA

**Vancouver:**

Farr, Robinson & Bird, Ltd.

### SASKATCHEWAN

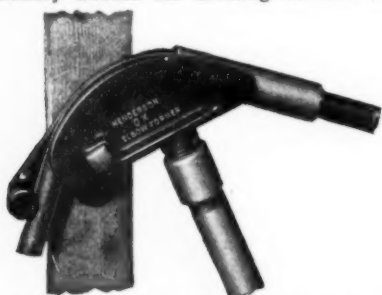
**Prince Albert:**

Prince Albert Electric

## News of the Manufacturers

### Conduit Bender

The Henderson Electric Co., Ampere, N. J., is putting on the market a hand hickey and stationary bender for bending conduit with-



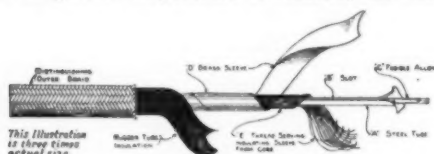
out kinking. It is made in six sizes to take 1/2 in., 3/4 in., 1 in., 1 1/4 in., 1 1/2 in., or 2 in. conduit and the handle is threaded to take either a 1 in., 1 1/4 in. or 1 1/2 in. handle; or a 2 in., or 3 in. pipe brace.

### Self Threading Connectors

Crouse-Hinds Co., Syracuse, N. Y., have put on sale a new self-threading union and a self-threading connector. The first is designed for use whenever it is not convenient to thread the conduit but where some type of union is needed. No endwise movement of the conduit is required to make the union as the nut threads itself onto the pipe. The connector is especially useful where a connection is necessary on a conduit that is too little exposed for threading; it threads itself onto the pipe.

### Fire Detecting Wire

The Garrison Fire Detecting System, Inc., New York City, recently placed on the market an automatic fire detecting device that is designed for protection over furnaces in homes. The basis of the unit is a thermostatic wire about 3/16 in. in diameter. The core of the wire, which is one side of the circuit, consists of a fusible alloy insulated from the brass sleeve (the other side of the circuit) by a cotton serving thread. When a dangerous temperature is reached, the core



FIRE DETECTING WIRE

of the wire fuses and spurts through the thread and coming in contact with the sleeve it forms a short circuit that rings a bell. The bell may be located in the sleeping quarters or any other convenient place. The wire is waterproof and will not short circuit, the manufacturer claims, when tapped with a heavy hammer. The manufacturer packages an assembly for contractors, consisting of a length of fire detecting wire, an alarm bell and a push button for tests.

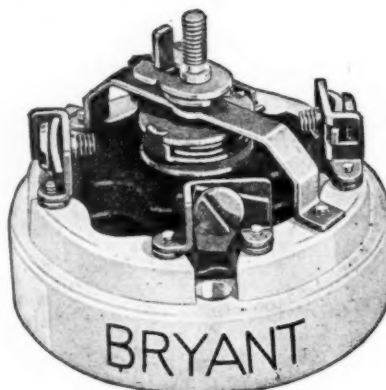
### Drum Switches

Three new drum switches are announced

by General Electric Co., for use with squirrel-cage and slip-ring motors. The first is a primary resistance drum switch, providing four points forward and four reverse and is suitable for motors that do not have an overhauling load. The second provides four points forward and one reverse and is suitable for use where there is an overhauling load; that is on hoists where a worm gear or automatic mechanical load brake is not used. The third is a primary and secondary reversing switch for slip-ring motors, with five points forward and reverse. It is suitable for starting duty or speed-regulating duty and for use with 220-440- and 550-volt motors, rated 15 h. p. and less, where a 5-point switch would be chosen.

### Heater Switch

A new standard heater type switch has been added to the line by the Bryant Electric Co., Bridgeport, Conn., with a reversible rotation, indicating handle, and nickel silver angle cover. It is a solid base switch, single pole, series parallel, three heat, operating high, medium, low and off; rated 20 amp. 125 volts, 10 amp. 250 volts. The center post extends the length of the switch with two



bearings at the top bridge and the bushing extending through the base to prevent the operating mechanism from getting out of line. Many heater switches of this type require special construction and the Bryant Company announces it is prepared to make specific recommendations upon receiving detailed information.

### Garage Trouble Lamp

The Rodale Manufacturing Company, Inc., New York, has begun production on a new



garage trouble lamp, which is sold in a package with a reflector guard and hook and 12 or 20 ft. of wire. The company's catalog number is 230.

### Soft Rubber Plug

Belden Mfg. Co., Chicago, has added to its cord department a new soft rubber plug for use on household appliances, office and store equipment, portable shop tools, etc.



The plug may be dropped or knocked about without injury. The plugs are sold only as a part of Belden cords, which are furnished in 10, 20 and 50 ft. lengths.

### Airport Lights

General Electric Co., Schenectady, N. Y., has issued a bulletin No. GEA-906, on airport boundary lights, which are used to mark the boundaries of aviation fields so that oncoming pilots can see a pattern of the field. They are spaced from 200 to 300 ft. apart. Clear and inside-etched globes are used; ruby globes for obstruction markers, being placed on pole lines and the highest points of buildings; green globes are placed to indicate the most favorable approaches to the field. The base may be buried about 18 in. in the ground.

In bulletin No. GEA-907, General Electric Co., Schenectady, N. Y., announces new design airway beacons which are mounted on 51-ft. steel towers spaced at 10-mile intervals. These beacons may be mounted at airports on a hanger or other building. The 24-in. beacon is used frequently, rotating at a speed of 6 r. p. m. Automatic lamp changers are provided for beacons visited only at intervals, and when one lamp fails the other automatically goes into service.

### Blow Torches

New alcohol and automatic blow torches have been produced by Lenk Mfg. Co., of Boston. The alcohol torch is the mouth blow type which has an encased blow tube to pro-



tect the air channel. The automatic torch produces a 1400 deg. blast, and has a rigid burner and pilot flame unit.



# HAZACORD

## ALL RUBBER PORTABLE CORD



**TOUGH**

**CLEAN**

**UNKINKABLE**

**H**AZACORD is an extra-flexible, all rubber cord for use on portable tools and apparatus requiring a tough, long-wearing, non-kinking cord.

This dense, tough, smooth rubber armor resists wear and tear and the action of oil, grease and acid.

**HAZARD INSULATED WIRE WORKS**

*Division of the Okonite Company*

**WORKS: WILKES-BARRE, PA.**

New York  
Atlanta

Chicago  
Birmingham

Philadelphia  
Seattle

Pittsburgh  
San Francisco

St. Louis  
Los Angeles

### Fuse Puller

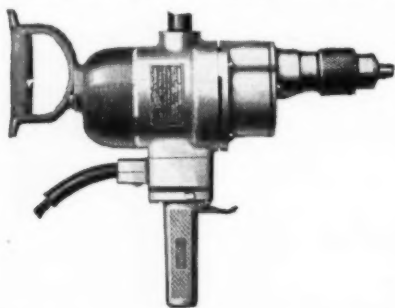
Trico Fuse Mfg. Co., Milwaukee, announces a new combined fuse puller and driver. The tool is 5 in. long. One end has gripping jaws for handling small cartridge fuses  $\frac{1}{4}$  in. to



$\frac{1}{2}$  in. in diameter; the other has a screw driver for use on small screws as found on electric sockets, plugs, radio apparatus, etc.

### Electric Drill

Van Dorn Electric Tool Co., Cleveland, is manufacturing a standard  $\frac{1}{2}$  in. electric drill with a universal motor with ball bearing armature and spindle thrust, hardened alloy



steel gears, and automatic safety switch. Speed is 540 r. p. m. no load and 300 r. p. m. full load. The overall length is 15 $\frac{3}{4}$  in.; weight, 14 lbs. and it is furnished for 32, 110, 220 or 250 volts.

### New Catalogs

Knox Porcelain Corp., Knoxville, Tenn., has issued a new catalog of knobs, tubes, and wiring devices made of porcelain. Among the items described are cleats, solid knobs, battery switches, bushings, ceiling buttons and switch bases, outlet box receptacles, and insulators for radio antennae.

A handy price list No. 403, has been issued by Star Expansion Bolt Co., New York, containing information on expansion shields and kindred products.

Edison Lamp Works of General Electric has issued a bulletin on lighting the home with information on amount of lighting needed in each room, size of lamps required, suggestions for fixtures, etc.

A new price list effective March 1, has been issued by the Rawlplug Co., Inc., New York City. This is the first radical change in prices in over six years. Some prices are increased and some decreased.

Crouse-Hinds Co., Syracuse, has issued a bulletin on airport lighting equipment, which includes such items as revolving beacons, field markers, boundary lights, hangar illumination, landing field lights, and course lights.

Emerson Electric Mfg. Co., St. Louis, has issued a new price book and motor data book, No. 62, which includes motors and ventilating equipment. A new fan catalog has also been issued, including price lists and specifications of the entire line of fans.

The Toledo Pipe Threading Machine Co., Toledo, Ohio, has just issued Catalog J covering pipe threading devices, pipe cutters, vises, work benches, boring tools, power drives and

power pipe machines. In addition to pictures, descriptions and data on these tools, repair parts are catalogued and prices given.

Garrison Fire Detecting System, New York City, has issued a booklet on automatic fire detecting wire, which describes its supervised and automatic systems and its complete outfit for the electrical contractor.

Two new catalogs, Nos. 18 and 19, have been issued by Edwin F. Guth Co., St. Louis, Mo., one covering fixture specialties, switch plates, exit lights and showcase lights; the other covers large fixtures for public buildings, lobbies, and outdoor fixtures.

The Chase-Shawmut Co., Newburyport, Mass., is distributing a new catalog No. 271, of fuses, tube fuses, fuse links, renewable fuses, fuse cutout bases, terminals, clips, fuse wire, and wire lugs.

S. H. Couch Co., Norfolk Downs, Mass., has published a bulletin on tilting mail boxes for apartment houses and telephone systems.

The use of floodlighting of prisons to aid guards in preventing the escape of convicts is discussed in bulletin No. 2105 of the Crouse-Hinds Co., Syracuse, N. Y., and several types of floodlights which may be used for this purpose are described.

Westinghouse Electric and Manufacturing Co., East Pittsburgh, Pa., has issued its new 1,200 page catalogue of electrical supplies dated 1928-1930. This contains every product manufactured by the company, together with layouts, diagrams, and full data, and prices in many cases. The catalog is indexed with a cut-in, thumb-type index.

Star Expansion Bolt Co., New York, has issued a 1928 edition of its Handy Price List, No. 403, covering expansion nail anchors, drills, lead screw anchors, copper expansion shields, and concrete inserts.

A new catalog on threadless fittings has been issued by Erie Malleable Iron Co. of Erie, Pa., which pictures and describes the "Kondu" line of boxes, flush switch boxes, and other conduit fittings.

A new catalog, No. 46, of industrial fire alarm systems and apparatus, has been published by Stanley & Patterson, New York City. The line includes fire alarm boxes, control cabinets, gongs, buzzers, and auxiliary devices.

### News of the Manufacturers

J. D. Behnke has been appointed district representative for the Standard Electric Stove Co., covering western Missouri, Kansas, Oklahoma and southern Nebraska, with headquarters at Kansas City.

The Wagner Electric Corp., St. Louis, Mo., has opened a new branch office at 475 West Peachtree St., N. E. Atlanta, Ga., under the direction of Roy F. Druschky.

E. P. Gleason Mfg. Co., Inc., has moved to new offices at 22 East 41st St., New York City, where a modern showroom is being operated in connection with the offices. This is the second move the company has made in the past 76 years.

Simplex Electric Heating Co., Cambridge, Mass., has sold its entire lamp socket appliance business to Edison Electric Appliance Co., Inc., which will continue the manufacture and sale of these devices.

Trumbull-Vanderpool Electric Mfg. Co., announce the appointment of Leighton B. Underwood as district sales manager in Philadelphia.

Martindale Electric Company, Cleveland, Ohio, has opened a branch in New York at 6 East 46th Street in charge of E. H. Mitchem.

The carbon sales division of the National Carbon Company, Cleveland, Ohio, announces the opening of four new branch sales offices, with the appointment of each district manager as follows: E. G. Friday, New York City; J. L. Green, Chicago, Ill.; V. J. Nolan, Pittsburgh, Pa.; J. B. Collins, Birmingham, Ala.

The Cutler-Hammer Manufacturing Company, Milwaukee, Wis., has announced the opening of Pacific coast sales offices with the following executives: In San Francisco, Cal., Fred H. Oberschmidt, A. A. Tuffert and George P. Stone; Los Angeles, Edward G. Nelson, and Seattle, Thomas N. Bristow.

Mohawk Conduit Company, Inc., Cohoes, N. Y., has appointed the Hastings Electrical Sales Company, 42 Binford Street, Boston, Mass., as its New England sales agent and the Weir-Smith & Co., 58 Warren Street, New York City, as its sales agent in the metropolitan district.

The General Electric Company, Schenectady, N. Y., has created a motor division of its industrial department with F. M. Kimball as advisory manager and J. E. N. Hume, manager.

The Appleton Electric Company, 1701 Wellington Avenue, Chicago, Ill., has just published a 36-page bulletin showing a line of "no-thread unilets" and accessories for same.

Curtis Lighting, Inc., Chicago, Ill., has appointed Irving D. Smith resident engineer for Canada with offices at Toronto.

George Richards & Co., 557 West Monroe Street, Chicago, Ill., has been appointed sales agent for the Wirt Company of Philadelphia. The territory will include all the states except the Pacific coast and those considered tributary to the cities of Boston, Philadelphia, Washington, New York and Norfolk.

Erie Malleable Iron Company, Erie, Pa., has issued a new catalog of threadless fittings, containing pictures and descriptions of items in the line from adapters, boxes and covers, to plates, receptacles and wrenches.

Federal Telephone Manufacturing Corporation, Buffalo, N. Y., has issued a new catalog, No. 1110, of Federal telephone systems, including interior private systems and switchboards for apartment houses, schools, offices, industrial plants, residences, hospitals, etc. Wiring diagrams, complete data on the line, are given.

The John I. Paulding Company, Inc., New Bedford, Mass., announces the appointment of M. B. Shaber Company as representative in Michigan and Northern Ohio, with offices at 2032 East Twenty-second Street, Cleveland, Ohio, and 131 East Jefferson Avenue, Detroit, Mich.; also George E. Anderson Company, located in the Allen Building, Dallas, Texas, as representative in the states of Arkansas, Louisiana, Oklahoma, Texas, Mississippi and the city of Memphis, Tenn.